

DETAILED REPORT

ON THE

Survey of language achievement, reasoning ability and memory
in relation to academic achievement among high school
pupils attending English medium schools in and round Calcutta.

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PREFACE

In order to produce educated intelligentsia and adults who would be well adjusted to the demands of a future society it is important to improve the quality of education and to plan educational programmes in keeping with modern knowledge. With the staggering rate at which knowledge increases, what a child learns today is likely to be outmoded in the next ten years. The lasting contribution of education under these circumstances would therefore be the development of the capacities of thinking and reasoning, the storage of useful knowledge and experiences and control over language, besides character development.

It is whispered all round that our schools emphasise the storage aspect of learning to the detriment of thinking and reasoning. Furthermore, though almost half the number of school hours are spent on language learning, the modern youth has a poor control over any single language.

The present investigation was undertaken to discover (a) the standards attained by our high school students in the three important aspects of the learning experience: language, reasoning and memory; (b) to consider whether performance on certain factors; (c) to establish the relationships among and between the language, reasoning and memory variables; (d) to study the contribution of language, reasoning and memory to school achievement and (e) that of reasoning and memory to language achievement.

The project, supported and financed by the National Council of Educational Research and Training was undertaken through the Extension Services Unit of the DEPSE at St. Xavier's College, Calcutta. To ensure that some practical benefits accrued to the schools and the children who participated in the scheme, efforts were made to undertake some predictive work. Predictions were made about the performance of the students one year after on the basis of the data available and the weightage assigned to the language, reasoning and memory factors were computed to fit students into the best suited subject streams.

The survey is limited to English medium high schools in and around Calcutta. English is the medium of instruction at the University stage in education. The high school is the weakest link in the educational process and the culmination point in formal learning for many a youth.

The present survey was undertaken in 18 English medium high schools in Calcutta selected randomly. All the Class 10 students (367 boys and 198 girls) in these schools

were tested on the 1960 revision of the Cooperative English test, four factorial reasoning tests and the Wechsler Memory scale, form I.

The report is divided into seven chapters. In chapter I the needs for improving the quality of education; the importance of language, reasoning and memory and the particular problems investigated are discussed. Chapter II deals with the design of the survey and demographic data. In chapter III information is given about the tests used, their administration and the scores and variables yielded by them. In chapter IV the influence of such factors as sex, subject groups, examination stream, English as a first and second language, teacher qualifications and fees charged by the school, on achievement in English, reasoning and memory are investigated. Chapter V deals with the intercorrelations among and between the language, reasoning and memory variables. Chapter VI is divided into two sections. Section I deals with the contribution of reasoning, language and memory to school achievement while section II deals with the contribution of reasoning and memory to language achievement. Chapter VII is devoted to integration and discussion of the results and some observations and suggestions offered in the light of the findings.

The practical aspects of the project are dealt with in Appendix A. The rest of the appendices include local norms developed especially for the language and reasoning tests used and the occupational classification used in classifying the parents of students.

CHAPTER - I

INTRODUCTION

I.1 The need for educational change

The central problem in the field of education today is the need to improve the quality of education. The nation needs competent men and women, in large numbers who can face the world with courage and who, through sincere and sustained effort, would put a shoulder to the wheel of progress and help our nation to move forward into a glorious future.

The quality of education dispensed in our school can have far reaching effects on the country's economy and future progress. The potentialities that are developed in the students of today are those which they will be best equipped to utilize when solving the manifold problems of building and running a country and their own lives as adults. If the future of our nation is to be insured it must be placed in the hands of able and well-equipped men and women of tomorrow.

The planning of educational changes is dependent upon a knowledge of the outcomes of the existing system. The present investigation was undertaken with a view to gain an insight into some aspects of the outcomes of educational experience gained by Indian youth in schools which teach through the medium of English.

With the Government's policy of industrialization, equal opportunity for all and self-sufficiency, it is imperative that the educational system must also trim its sails to suit the breezes of time. It is, therefore, not only necessary to provide education for our future citizens in quantity, so that every child of India has an opportunity of obtaining an education. It is just as important to ensure that the quality of education is as high as possible. India must also make every effort to catch up with the rapidly changing societies by accelerating her own rate of change.

The gain in bringing our nation's citizens to the point of self-sufficiency in an economic sense, or in a psychological and social, is immeasurably significant to our prestige in the community of nations. To those nations which support and nourish our hopes and efforts, the investment they make would then seem worth while, as it would yield proportionate returns.

If we raise the question "what could India afford to pay for self-sufficiency a decade earlier than it will eventuate in the natural course of events?", we raise the question of how our present day educational system could serve us best. If we could attain this goal by deliberate, radical and imaginative attempts to reconstruct the educational programme, by departing from the routine and traditional educational methods, the social outcomes are inconceivable. The need for well educated people capable of taking decisions independently, men and women who can reason out a problem and express themselves appropriately in relation to the need for participation in and management of this fast industrializing nation is increasing in crescendo. We believe that our nation is not lacking in talent. Our schools even today have boys and girls who possess intellectual abilities similar to those of Narlikar, Jagdis Chandra Bose, Sir C.V.Raman, Homi Bhabha, Dr Sarvepalli Radhakrishnan and Rabindranath Tagore.

In an era of automation and global communication, with the world as our neighbour, in a nation whose energies are directed towards rapid industrialization and self-sufficiency, our educational system should be suited to produce the kind of adults who will be adjusted to the society of two decades hence. The rate at which the developing nations progress is staggering. In order to maintain a balance, our educational system must, therefore, be revolutionized to keep abreast with the times at a rapid pace.

If the boundaries of knowledge recede as rapidly as it is claimed what is the most important thing, the child must learn from his teachers? Not antiquated facts, but an understanding and appreciation of basic concepts and principles which he can use to reason further in order that he may enjoy the thrill of discovery and swell the ranks of our scientists tomorrow. It is most imperative for the child to use his ability to store the basic principles and concepts in his memory, so that he may recall them at will and use them effectively when necessary. An individual who is a store-house of facts and concepts, but who has no control over language who cannot express precisely what he thinks, is like a perfectly made machine without the power to make it function. Effective expression is the high octane that makes for effectual individual functioning and can make the difference between success and failure.

If the explosion of knowledge is as terrific as Dr Clanton Williams (Chief Educational Advisor, US AID) believes then we have no time to waste and the few years that children have in school could best be utilized in generating in them those functions which will stand them in good stead wherever they go and in whatever condition they find themselves. The effectiveness of our educational system to do so depends on the incentives we provide in our programmes for the youth to be prepared for tomorrow.

So much have the natural features of our ancient civilization changed that Rama, King Ashoka and our ancient sages would be bewildered to see the portrait of hungry India, dependent on others and torn by internal strife, lacking mutual tolerance, with one foot in the jet age and the other in superstition, ignorance and bigotry. We consider ourselves a free people, but we have not yet broken the shackles of mental bondage. It is against this setting that the existing educational system must be viewed against a backdrop of everaccelerating movement forward with the burdens of poverty, disease, ignorance, selfishness and dependence.

The existing educational system in India was designed to serve the needs of the British rulers: to enable them to produce a rich harvest of clerical assistants who faithfully carried out their duties. Though the Indian Educational System bears the stamp of an ancient heritage, it can hardly continue to live on its glorious past. Designed for a small society with no problems of an exploding population to grapple with, this ancient model may not help to fit our youth to the world of tomorrow.

The social needs of India today are not the same as they were even twenty years ago. The crying need of the day is the emotional and social integration of the people of this subcontinent, releasing the masses from the shackles of poverty, disease and ignorance and helping to create a Janata that can think for itself, composed of people who are not gullible to all kinds of propaganda. We need to build strong fortresses of the mind, whose windows are open to let in the breezes of modern times, but bristle with activity within : fortresses that are not completely impenetrable to impressions and therefore capable of adaptation and change.

It is not only necessary to train the citizen of tomorrow to form the habit of thinking for himself, but also to remember his past experiences from which he may benefit and arrive at decisions for future action which benefit him as an individual and the social milieu in which he functions. In order to derive any benefit from the experiences he has, an individual must comprehend and perceive them. He must understand what someone else tries to convey to him and be able to communicate his own thoughts, ideas and feelings in turn to his fellow human beings.

I.2 Language in Education

Language is man's avenue of expression, his channel of communication with other human beings. As such, language serves a number of purposes in a child's life. Its indispensability can be gauged from an idea of the dumb individual's enormous handicap and difficulty in adjusting himself to society.

Language allows man to express his ideas, thoughts, wishes, desires, to share his joys with others, and to comfort others. If man is deprived of this ability he is bitter, unhappy and unable to fulfil his desires. Hence, language is essential for proper social adjustment and for the cultivation of friendship. A child who lisps or stammers, though not as unfortunate as the completely dumb person, nevertheless, finds difficulty in social adjustment. Language promotes healthy social relationships. The person who can understand the conversation taking place in his presence does not feel isolated or lonely.

The ability to convey mutual ideas and opinions through the media of language, serves as a channel of progress. It is only when children intermingle with other children that a broader outlook is developed, and a higher goal pursued. If they fail to express themselves their ideas are confined to their own narrow world.

Language as a means of communicating with others is useful in establishing and maintaining social contacts. It helps in the communication of feelings and thoughts and enables coordination and cooperation of effort. Language is important not only in expressing, but also arousing feelings of anger, fear, jealousy and joy. "Improvement in our ability to understand language as well as in our ability to use it, depends therefore not only upon sharpening our sense for the informative connotation of words, but also upon the sharpening of our insight into the affective elements in language, through social experience, through contact with many kinds of people in many kinds of situations". (Hayakawa)

Language is often the result of intellectual reflection and arouses reflection in the listener or reader. It can be used to formulate concepts, convey information or to control events, people and their actions. Language is useful in solving problems. It is important for recalling information, to bring past experience to bear on the present situation; to look ahead into the future and talk about related items as well as to integrate experiences.

Language not only enables us to express our thoughts, but also enables us to understand those of others. In this way we gain a weapon for influencing others. The ability to communicate not only brings us under the control of others, it also adds strength to our individuality by opening up channels through which the resources of the group flow into us and sustain us.

Language in the process of education is all important as a tool for learning and teaching, as a means of recalling past experiences, becoming aware of the immediate present environment, anticipating, planning and directing future activity. Language is a type of vicarious behaviour in which we react with people, places, things and events either present or absent. Perhaps the greatest value of language is that it permits a comparison of the present with the past and the future. Itself a cultural acquisition, language once acquired is an open sesame to knowledge and culture otherwise beyond the individual in time and space. It links the various thoughts of generations to form a chain of continuity.

Language is the best medium of thinking and reasoning. It is a complicated network of symbols in the form of words which can be manipulated once the rules of its structure are understood. By putting thoughts into words a person can make thinking effective. Skill in language means that the translation of words into movements are dispensed with. As a consequence, the process of thinking becomes simplified and abstract thinking also becomes a possibility. The development of thinking therefore is dependent on the development of language to some extent.

The importance of language in conceptional formation can hardly be overestimated. A word in any language becomes a focal centre for the meaning, whether that meaning assumes the form of images, ideas or actions. Many a times we grope about in our minds for a particular word to express a thought. Often we use a poor substitute. It is important to select the right words in order to think clearly and precisely and also to convey our concepts correctly.

Language is invaluable in helping us to analyse complex wholes into their parts and to synthesize fragments of experience into a whole. It is an instrument of conceptual analysis and synthesis. The intercommunication of ideas implies analysis of the objects and processes presented to perception into certain constituents which recur in varying combinations in various particular cases. The use of language involves an analysis of objects and processes

into common factors and their reconstruction out of these common factors. Language usage presupposes the breaking up of the concrete content of actual perception into its partial aspects and constituents and the rebuilding of these to form new wholes.

Language helps to focus our attention upon, and manipulate, abstract ideas which would otherwise be difficult to deal with. Hence, in order to educate a child for thinking, two parallel processes are important: the constant widening of personal experiences and the extension of vocabulary. The growth of language at times needs to keep ahead of the natural and spontaneous growth of thought in order to stimulate the formation of concepts. Without language, we might be able to form rudimentary concepts from the analysis and synthesis of perceptual experience, but we would have no means of stabilizing them in our minds, or of communicating them to others, if we had no words to label them. As Prof. Spearman puts it, "language makes our concepts become like molten bullion poured into coining moulds, whence they issue as legal tender for general circulation". After obtaining concepts from our perceptual experience and analysis we label them with words and then extend their significance still further through the use of language. Our concept of 'tamarind' for example would remain rudimentary if we could not discuss, by way of speech or writing the various aspects that do not actually form a part of our perceptual experience. Further, without language, it would be impossible to form, comprehend or express abstract concepts like liberty, justice and truth. A code of readymade formulae with fixed meanings, language assists memory and facilitates thought.

Language is not only useful in expressing and communicating real perceptions and experiences, but is also effective with imaginative flights of fantasy and poetic thought. It is a source of aesthetic delight. Words bring enjoyment.

A good command over language lends assurance, builds self-confidence, adds colour to an individual's personality and increases popularity. The person who possesses the ability to express himself aptly and relevantly may be said to possess a major asset that would aid his success.

Proficiency at language is of primary importance to a student if he has to understand his teacher and to pursue his studies. Words are the keys to the kingdom of knowledge. If we are to learn the thoughts of others, widen our outlook, increase our learning and express our own thoughts and feelings precisely, we must be proficient at language. With this weapon we cross the threshold of illiteracy and ignorance and are often raised from mediocrity to success.

Language, therefore, plays a vital role in the life of man and child. It helps him to capitalize his thoughts and to communicate them to others. It enables him to comprehend what the world of people, objects, events and books says to him as well as to express himself to others efficiently. Language enables a group of people to pool their thinking and thus successfully execute the social enterprises which depend on teamwork.

Since language is so essential to man, one of the primary aims of education is to make children proficient at it. Language teaching is therefore one of the major tasks of education and comprehension and expression the twin aspects of language to be emphasized.

In books, journal articles and discussions one reads about the need to teach students language as a means for reading books. In short, language is to be learnt for comprehension. But either no mention is made of, or no stress is laid on, the creative aspect of language: the use of language to produce, to express thoughts, ideas and feelings to reason, to argue, to create. Language is a tool that can be used, not only to acquire knowledge, but also to give and to create knowledge. A good grasp over language helps to reinforce the study of the other subjects.

The University can start and continue the education of the student where the school leaves off. The University must in all fairness be given every opportunity to impart higher education and it is hardly fair to lay the complete blame on the University for the poor graduate that emerges from its portals. The foundation of all learning is laid at school and it is only upon this foundation that the University can erect the edifice of higher learning. The school must therefore honestly discharge its duties of educating the pupils and ensuring that they attain high standards. It is the schools that are to blame for the poor quality of scholars that India is producing. India is not lacking in brain potential, but the foundations of our educational plant are weak. The machinery responsible for the ultimate refinement of the intellect can hardly be blamed, if defective material is fed into it.

The school in India is at best an impoverished nursery for the intellect of our youth. Is it any wonder than that a weak and struggling plant comes to the University where it either remains impotent or bears poor fruit? At best, the University can help to nourish the intellect to bear fruit; but instead our University professors have now to turn into nurse maids for nurturing the weak plant of intellect and coax it to continue its existence, even if not to bear fruit.

I.3 Importance of English in India

English occupies a vital place in India as an official language which enables communication to be maintained between the different linguistic regions and the Central Government. It helps to maintain the political unity of India and is an invaluable instrument for fostering national integration. As a medium of instruction in higher education, English enables us to keep pace with education and knowledge in the technologically and scientifically advanced countries of the world. As members of the world community, Indians today need to be able to communicate with the peoples of the world more than ever before. Hence, it is imperative that we achieve a high degree of efficiency in English and give up any childish ideas about 'ousting' English because it was the language of our rulers.

Reports that standards in English are dropping are available from various parts of the country. In Gujarat it has been observed that students receive the lowest marks in languages at the S.E.C examination and that this has an indirect effect on achievement in other subjects like science and social studies (Desai 1965). Achievement in English, which is the medium of instruction at the University stage was studied by experts in Bengal (Gayen et al, 1965), and it was discovered that only 6 out of 1,000 students obtained 60 per cent marks in the Higher Secondary Examination while nearly 7 per cent of students obtained between 50 and 60 per cent marks; 50 per cent of students obtained between 36 and 50 per cent marks; 37 per cent of students fail to obtain even 36 per cent marks in English. Many of those obtaining third division marks have compensated for their deficiency in composition by learning their grammar "To make the minimum pass mark, grammar contributed most of its allotted marks.... In composition covering 50 marks, as high as 72 per cent of students have failed to secure pass marks. This in spite of the fact that about 10 per cent of the candidates in English have passed through lenient assessment".

The objective of teaching English in secondary schools is to help students to express themselves correctly and to write without errors. Judging by the results of the students at the Board Examinations, one is hardly encouraged to think that the objectives are being fulfilled with such a poor performance as to produce a paltry 2-3 per cent of first class students and 75 per cent of students educated by our schools rejected as unfit for higher education. The colossal waste of money, time and effort spent on about 35,000 students (in 1957) in one single State alone is staggering. The aims of teaching English remain unfulfilled and there is evidence of a marked deterioration of the quality of student performance. Not only do students express themselves poorly, but they even seem to lack ideas. The

common errors made by students are those connected with spelling, structure, rules of syntax, the use of the tenses, transitive and intransitive verbs, gender and the participle. Many candidates find it difficult to produce a single correct sentence and teachers have to accept such things as "Indian fillums", "Miss, the Bobby beating", etc.

It has further been observed that the students at both the Board of Secondary Education and the University examinations fail to comprehend the meaning of the questions set. They may understand one word in the question and immediately proceed to write down all that they happen to know about it. It is not uncommon for employers to receive letters from employees requesting for leave of absence on the ground that "as I am the only one husband of my wife and she is in the family way.....". Apart from writing, pronunciation of the words of the English language differs from State to State in India. Starting with "Satation" in the North to "Isation" in the South, we may travel round this subcontinent without recognising that English is being spoken.

1.4 Importance of medium of instruction for academic achievement

Students must obtain knowledge from others or from books. Books use language to explain facts, theories and principles. Teachers and others also use language to express and explain what they desire the student to absorb. The higher the student rises in the academic world, the more complicated and complex is the language used both by his teachers and his books. The story of our Universities is replete with cases of students who enter their portals to be lectured to through the medium of English after having used the State language upto the high school stage, failing to understand their professors and failing to make the grade in college as a consequence. A review of the answer scripts of the School Leaving and University examinations is enough to convince anyone that though the student might understand his subject matter, his academic achievement is poor, because he is unable to express himself. For this very reason such plans as special tutorial work for the Pre-university students and special emphasis on wide reading have been suggested.

Unless the student comprehends ^{the} language which is the medium of instruction and gains control over his expression in that language, academic achievement will suffer. Language achievement is, therefore, important for academic achievement and it is expected that the two will be correlated.

Of the four skills involved in language learning - listening, speaking, reading and writing - the one which is likely to be the most useful for our students is reading

followed by writing. Every student has innumerable opportunities for using this skill. Indian students use English at the University stage to listen to lectures, to read their books and to express what they know. The main purposes of teaching English at the high school level should therefore be to help students to understand what they hear and read and express their thoughts through the medium of English.

I.5 Learning a Language

In learning a language the ability to learn, retain and recall when necessary new sounds, spellings and symbols for things and phenomena is important. These new sounds and symbols (words) must be strung together according to certain rules. The beginner is taught these rules by his teacher, but when he himself tries to connect words together coherently to produce sensible and understandable sentences it is not sufficient for him just to recall the rules. He needs to think about the words and their placement. He must choose the correct word to fit the sense he desires to convey. He may make a mental comparison of a structure he first tries out, of the words he has selected for use, with one he may have used in another setting before actually expressing himself. On making the comparison the student may decide to reject his original idea and try creating another structure. In comprehending language, written or spoken, the individual must interpret the words and relate them to the actual thing or phenomenon and to other similar words, some of which sound alike, while others mean the same thing. He must not only understand each word separately, but perceive the entire sentence as a whole before interpreting it. The processes of mental exploration, of trial, decisionmaking, of looking for interrelations and grasping patterns is therefore actively present in language achievement. Comprehension and expression both involve the process of controlled thinking, retention, recognition and recall. Reasoning and memory are therefore necessary in language achievement.

The contribution made by reasoning and memory towards achievement in English (the medium of instruction) was investigated by us. We did not require the student to create sentences and express himself. The contribution of reasoning to the English expression test is measured from the point of view of the processes an individual would use in critically appraising another's performance in English, and not what he would do if he were given the opportunity to express himself freely.

I.5 Reasoning - a Plea for Reasoning - based Education in Schools

Today knowledge is so vast that all that a child can accumulate till he reaches high school is but a microscopic fraction of what there is to know. Besides, to-day's facts may well turn into tomorrow's outmoded theories with the rate at which contemporary conceptions become displaced by new sets of facts. Many of the concepts that our children learn are already outmoded. Hence, it is bad enough that facts change and that the children of today spend their time acquiring wrong concepts, but what is worse is that many of these facts will never be of any use to the child when he grows up and assumes the role of a citizen. As a citizen in his family life, during work and leisure and while participating in civic and social affairs, what will be of most use to him will not be the simple recall and application of facts learnt in school, but the thought processes of reasoning, judgment and inference.

Time and again it has been scientifically proved that linguistic and reasoning abilities are closely associated with general intelligence and useful for scholastic achievement. Dr Thurstone (1958) claims that tests of verbal meaning and of reasoning yield the most satisfactory correlation coefficients with criteria of school success. The authors of the DAT conclude that tests of verbal reasoning, numerical ability and abstract reasoning measure functions associated with general intelligence and are useful as measures of scholastic ability. They report that sums of score on verbal reasoning and numerical ability correlate with later school work from .70 to .80. Hence, verbal, numerical and other types of test items requiring abstract reasoning have proved to be valuable for general ability and educational promise.

Is it not sensible therefore that the educational system should teach a child how to seek facts and concentrate on developing precision and appropriateness of the thought processes rather than the adding of layer upon layer of facts through successive years of schooling? For successful adjustment it is important for a person to understand the functional relationships among groups of things and events, and also to acquire an insight into the need for new facts after realizing the limits of his present knowledge. This accrues as a result of reasoning. Education, therefore, should involve graded experiences involving classifications, generalization and abstractions with different types of subject matter so as to equip the student to deal effectively with the changing circumstances of his life. Practise with a variety of problems would train the individual to slide into the right intellectual gear according to the exigencies of life faced by him.

Reasoning is the mental recognition of cause and effect relationships, the prediction of an event from an observed cause or the inference of a cause from an observed event. Reasoning may be described as mental exploration. It is following one clue after another. So, in a way, it is a process of trial and error. Reasoning culminates in inference. The reasoner ransacks his memory for data from various sources which have a bearing on the problem. He looks for interrelations among the information and tries to grasp the pattern that emerges from the grouped data. Reasoning is the process of controlled thinking which is directed towards the solution of some problem of interest.

It is extremely important to teach a child how to think and reason. A vitally important single goal of education is the sharpening of the ability to solve problems. Every individual needs to find solutions to certain problems, to weigh and judge alternatives, to make choices and to plan. Reasoning helps a person to think deeply and to act intelligently. The ability to reason is indeed a great gift to man. It helps him to survive.

The power to reason serves an educational purpose. In fact, this ability underlines the basic conditions of education. Education is the process by which man develops his latent mental abilities and simultaneously absorbs new ideas from the environment in which he lives. In order to do this, to analyse scientifically, to decipher true from false, and to progress he must possess the ability to reason. It is reasoning that has enabled man to progress from the cave to modern civilization, to increase his comforts and leisure and to lead a moral life. To be able to choose the right path man should be able to abstain from doing wrong. The ability to reason greatly eases the conflict between what a man should do and what he desires to do by enabling him to foresee consequences. This ability is also the rudimentary ingredient in the recipe to progress. When he does not take advantage of his ability to reason man's progress is suspended and a stalemate arrived at.

In view of modern ideas about curriculum construction, aims of education and the setting of a fast moving world, it is vital to stress the importance of reasoning in academic achievement. It is alleged that our schools concentrate more on teaching children to reproduce parrot-like what they have learnt rather than developing their ability to reason. Parents complain that memory plays a greater role than reasoning in our educational system. Examiners at the Board and University Examinations observe that the answers of students display more memory work. Material is indiscriminately presented irrespective of the particular topic specified in the question and answers which have been learnt by rote from notes are reproduced.

verbatim without sifting the grain from the chaff. While committing to memory numerous passages of material the students normally fail to discover the meanings of unfamiliar words, phrases and structures. As a consequence, the finer points in a lesson often elude them and their vocabulary and control over language tends to remain static. Instead of emphasising reasoning in learning and evaluation, cramming is resorted to and mere memory is used as it pays high dividends.

Scientists have discovered that language and memory contribute to scholastic attainment among high school students at the Higher Secondary Examination, but no mention is made of reasoning. Joshi and Pathak (1966) have factor analysed the scholastic attainments of high school students and extracted verbal and general memory factors. "There is nothing to deny the fact that command over the language and organization of language ... play an important role wherever descriptions are needed", they say. In examining the meaning of attainment tests, they extracted verbal ability as a factor.

We are interested in discovering the contribution of reasoning and memory to school achievement in our schools. We would like to know if memory really plays a more vital role than reasoning in enabling a student to attain high marks at school.

Memory

Though the criticism has been levelled that in many of our schools the learning of facts plays the most important part and that it is overstressed to the detriment of understanding, one cannot deny that a knowledge of facts and principles is an acquisition necessary for success. A good memory is necessary for a pupil to obtain and retain the facts. Thinking starts with a problem and consists in the manipulation of facts and principles. Successful thinking is based on a knowledge (memory) of past achievements that are related to the problem. This means that learning, in the form of memorizing, is a necessary foundation for effective thinking. New inventions and discoveries are usually made by those who have first mastered what was previously known about the subject. Furthermore, a good way of learning how to think is to learn, first of all, how others have thought, how they failed and how they succeeded.

We all live in a world full of ceaseless activity, a world full of events which must be perceived, felt and stored for future use. A well-stocked memory enables a person not only to attain social poise and to enjoy simple everyday pleasures, but to follow the customs and traditions of his

social group and above all to thrust back the frontiers of knowledge and to create. One of the aims of education is to acquaint children with their cultural heritage. Without retaining and recollecting the customs and folkways of the social group the adults could not possibly pass them on to the youth.

Though the courses in the schools preparing their students for the different school leaving examinations are somewhat similar, the teachers teaching these courses differ greatly, and all in all, there is much material that our children must remember. The vocabulary, definitions, symbols and the rules of each subject must be learnt by the students before they can move on to solving any problems with speed and accuracy. The historical movements must have their dates, names, places and events as much as the physical sciences must have their rules and laws. It is alleged that our teachers require the pupils to learn too many facts and do not pay sufficient attention to the development of meaning and understanding. Further, in evaluating student performance teachers give more weightage to recall of facts than to a child's capacity to reason, express himself and to create. As a consequence, much of what the children learn is often superficial and of relatively little value.

Furthermore, it is generally recognized that intelligence has a very moderate relationship with capacity for rote memory ($r =$ about 30) - (Freeman: p 185). Rote memory (immediate recall), visual imagery and visualization (space perception and spatial relationships) items have low loadings on the general factor extracted by McNemar from his factor analysis of the two forms of the Stanford Binet Scale. The items with high loadings are: acquisition and use of vocabulary, verbal analysis of a situation; verbal and numerical concept formation; insights into similarities and differences (also involving concept formation); analysis and synthesis of materials, both verbal and non-verbal; organization and reorganization of materials, both non-verbal and verbal. Hence, it is reasoning and language which are signs of intelligence.

If we are to improve the general intellectual capacity of students through our educational system, we must train them to develop their capacity to reason and their language ability, since so much evidence, both in the form of public opinion and scientific information leads to the incrimination of Indian education as providing enormous weightage to memory and some to language with the total neglect of reasoning.

It was, therefore, considered important to evaluate the relative contribution made by reasoning and memory to

academic achievement. In the light of the findings, it was hoped that certain changes could be initiated, at least in the schools used in our sample on an experimental basis. It is also hoped to present educational planners, teachers and parents with a realistic picture of education.

Aims of the Project

The problems to which answers were sought may be summarized as follows:

1. The standards attained by high school students in English medium schools in the English language, reasoning and memory;
2. To consider whether performance in English language, reasoning and memory is affected by sex, school, examination system, subject stream and learning English as a first or second language;
3. The relationships among and between the language, reasoning and memory and school achievement variables;
4. The contribution of language reasoning and memory to school achievement;
5. The contribution of reasoning and memory to language achievement.

Framework within which Research was undertaken

It is important to comprehend the framework within which the present investigation was undertaken. The research project, completely supported and financed by the NCERT, was actually undertaken through the Extension Services Unit of the DEPSE at St. Xavier College, Calcutta. The Extension Services Unit has been set up for the specific purpose of helping schools to know their problems and to solve these by pooling their resources. This particular centre is entrusted with the care of the English Medium High Schools of Calcutta.

It was considered that the activities of the Unit should be based on certain real needs and upon a surer knowledge of these needs than just the feelings and imagination of the officer-in-charge of the Unit. To kill two birds with one stone and thus to obtain information of value together with effecting practical changes, therefore, became the aim of undertaking the present project. It was considered important to ensure that the project did not deteriorate into a purely intellectual exercise. Efforts were made to try and bring about some practical changes that would benefit the schools and the children, who participated in the scheme.

The teachers, parents and students are all interested in obtaining a knowledge of how the students are likely to perform in the future to enable them to make plans. Furthermore, little predictive work is ever undertaken by schools apart from guessing how their students are likely to fare in the future. It was thought that if such predictions as the placement of the student in a subject group or their academic performance after a period of time could be successfully made, it would not only be interesting to the schools the children and their parents, but also useful for purposes of counselling and guidance.

Before improvements can be effected in the existing system of education, it is important to assess what is available today. With the limited resources available, it would be impossible to evaluate the quality of education in all schools and at every stage. However, if we could assess the quality of education given in some of our better schools, we can discover the limits of the best that is available in our land, and logically conclude something about quality in the educationally poor schools. An insight into the quality of education in schools where the teachers are enlightened would enable us to guess what teachers in the other schools do.

SAMPLE

(The present investigation was undertaken mainly in the urbanized area of West Bengal - in and around Calcutta. The schools in urban areas set the pattern for the rural schools to follow, so we are interested in investigating what some of the better schools have to offer to our children, and how we may help them to improve their wares).

The survey was limited to students of Class 10 in English medium schools. Class 10 was selected, because it is easier to obtain permission from the heads of schools to test the students. Class 10 students are representatives of the high school population and from the point of view of practical applications, any predictions made about the students would be of value to the schools, the students and their parents.

The Unit of the sample selected was the school. The frame; English medium schools in Bengal.

The study was limited to English medium schools, because of convenience, administrative cooperation, facility in test administration and availability of readymade tests in English. English is a language which is popular with many in the non-Hindi speaking States and higher education is mainly conducted through medium of English.)

Our sample was limited to the high school, because this stage forms the culmination of education in a school. Many children may not continue their education further. For them it is the end of an educational career, for they must now turn to earning a living in order to supplement the family income and support dependents. The rest of the children turn to higher education in some form or another. They start a new chapter in the history of their educational career. The end of an epoch, the school leaving examination marks a turning point in the life of a student. We are interested in discovering the kind of job the schools have done in guiding the learning processes of these children and what the students have achieved upto this age and stage.

The secondary stage in education is considered one of the weakest links in the educational process. As a culmination point for those who must join the ranks of the job seekers the secondary school has failed to prepare youth for the functions they will perform as citizens. For those who will proceed to temples or higher learning the secondary schools send ill-prepared, immature and often ill-balanced youth.

CHAPTER - II.

DESIGN OF SURVEY & DEMOGRAPHIC DATA.

One of the most crucial aspects of a sample survey is the decision about the number of cases and the methods by which they are selected. All the English medium schools in Calcutta were stratified on the basis of sex, public examination taken by the students at the end of the high school and the amount of fees charged. Using these 3 variables, all the combinations were worked out and the number and proportion of schools of each type in Calcutta computed. (In selecting the sample an attempt was made to randomly pick 50 percent of the schools of the different types while maintaining the same proportions as occurred in the population. In our survey we began by testing 825 students, but ultimately ended with complete information on 565 cases.

-II.1 Description of the Schools.

*Sex: A total of 18 schools were used in our survey, of which 9 were boys schools, 8 were girls schools and one mixed.

Examination: Of the 18 schools in our samples, 9 prepared their students for the Indian School Certificate Examination, 3 prepared them for the Higher Secondary Examination of the Board of Secondary Education, West Bengal, 2 prepared their students for the School Final Examination and 4 prepared their students for both the Indian School Certificate and Higher Secondary Examinations.

Subject stream: Two of the 18 schools offered only one subject stream (Humanities), 10 offered 2 streams and 5 offered 3 streams.

English: In 10 schools the students learnt English as a first language, in 5 they learnt it as a second language and in 3 schools there were students of two groups, one learning English as a first language and the other learning English as a second language.

Fees charged: The schools were classified into three groups on the basis of the amount of fees they charged. Those charging over Rs.35/- per month were classified as Type I schools, those charging between Rs.25/- and Rs.35/- per month classified as Type II and those

charging less than Rs.25/- as type III schools. In our sample survey there were 4 type I schools (2 girls and 2 boys); 8 type II schools (6 boys and 2 girls); 6 type III schools (2 boys, 3 girls and 1 mixed).

Table II.1.

DISTRIBUTION OF SCHOOLS CLASSIFIED ON THE
BASIS OF SEX AND FEES PAID BY THE STUDENTS.

<u>School Type</u>	<u>Boys</u>	<u>Girls</u>	<u>Mixed</u>	<u>Total.</u>
I ..	2	2	-	4
II ..	6	2	-	8
III ..	2	3	1	6
Total:	10	7	1	18

II. 2. Description of the Subjects of our Sample.

Number: Though the tests were administered to 825 students in 19 schools to begin with, complete data were available for 565 cases from 18 schools. The data from one school became invalid as a consequence of the students having resorted to malpractise during one of the testing sessions. The distribution of the cases from each school on whom complete data were available is presented in Table II.2.

Table - II.2.

Table displaying the number, mean and SD of the ages of students in each school:

<u>School</u>	<u>No. of students.</u>	<u>Mean age in months.</u>	<u>SD.</u>
1	27	207.5185	17.7542
2	12	203.0000	14.5144
3	29	189.6207	12.9466
4	34	189.1177	14.0142
5	42	188.3810	11.2588
6	9	195.0000	12.8496
7	31	186.8065	8.0058
8	44	192.0227	9.4760
9	21	190.0000	10.9718
10	28	179.1429	11.2463
11	49	186.2653	15.4203
12	21	189.9048	11.7104
13	17	192.8824	11.2558
14	15	183.6667	6.6899
15	30	186.6667	10.6843
16	37	194.6757	14.9594
17	17	195.3529	13.6077
18	102	190.2157	11.5890

Total: 565

Age:

The mean ages of the students in our sample varied between 183 months and 192 months. The distribution of the mean ages and the standard deviation of the students in each of the 18 schools are displayed in Table II.2. The chi square between the ages of the students among the schools is 95.6503. The critical value of χ^2 with 17 degrees of freedom being 27.5871, it is significant at the one percent level.

The means, SD and ² for age in months among different groups of students are displayed in table II.3. It was found that on an average the oldest students belong to the Higher Secondary group with a mean age of 192.7600 months followed by those in the Indian School Certificate with a mean age of 190.8254 months and the youngest are in the School Final, their mean age being 183.6753 months. Among the different subject streams the youngest students are in science (mean age 187.0375 months) followed by home science (mean age 190.7600 months) while those in the humanities and commerce groups are the oldest with mean ages of 195.0471 and 195.7875 respectively. Those taking English as a second language are younger than those studying it as the first language. Further, the youngest children are taught English by trained teachers with post-graduate degrees, but there is no significant difference between the ages of students in the schools charging more and less fees.

Table II. 3.

Means, Standard deviations, Chi squares degrees of freedom and significance of age in months of students classified on the bases of sex, examination, subject, English as a first or second language, teacher qualification and school type:

(see next page)

Table II.3 (contd)...

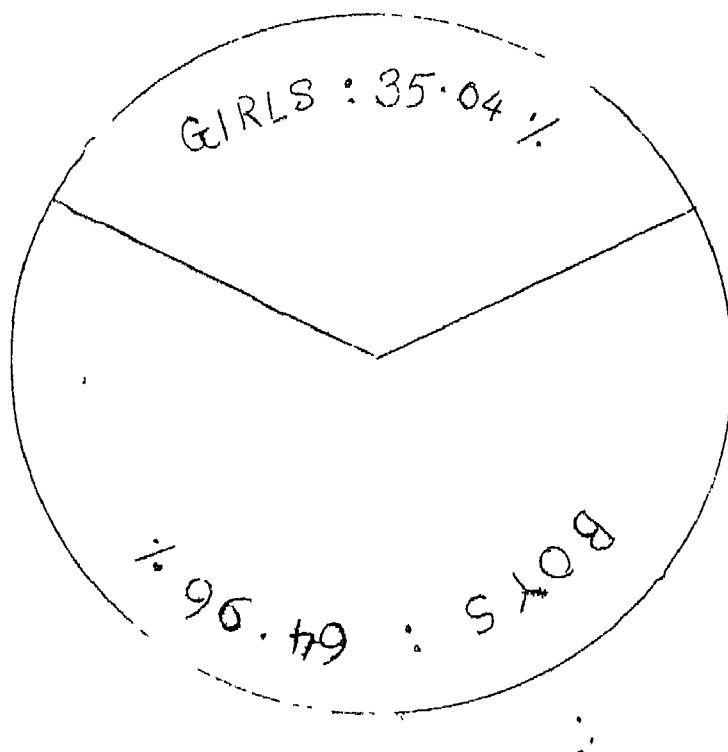
<u>Criterion of classification.</u>	<u>Sub-groups</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>	<u>df</u>	<u>P</u>
1. Sex	Boys					
	Girls					
2. Exam	Higher					
	Secondary	150	192.7600	13.8037		
	Indian					
	School Cert.	338	190.8254	12.8382		
	School	77	183.6753	14.4586	21.395	2 **
	Final					
3. Subject	Science	320	187.0375	12.6117		
	Humanities	170	195.0471	13.7549		
	Commerce	42	195.7857	12.3087		
	Technical	8	194.2500	11.4319		
	Home Science.	25	190.7600	15.0553	50.915	4 **
4. English	1st language	390	191.4769	12.8350		
	2nd "	175	187.8857	14.9207	7.609	1 **
5. Teacher Qualification.	Undergrad-untr.	27	207.5185	17.7542		
	Grad-untr	0	0.0000	0.0000		
	Postgrad-untr.	136	191.1912	11.7826		
	Undergrad-tr.	0	0.0000	0.0000		
	Grad-tr.	248	188.1936	12.0004		
	Postgrad tr	154	190.1234	14.5143	33.273	3 **
6. School type	I	198	190.0606	10.6990		
	II	225	189.8133	12.9324		
	III	142	191.6620	17.6316	1.212	2

** $P \leq .01$

1. Sex: Out of a total of 565 cases 367 or 64.96% were boys and 198 or 35.04% were girls.

Table II. 4.

SEX-WISE DISTRIBUTION OF THE 565
INDIVIDUALS

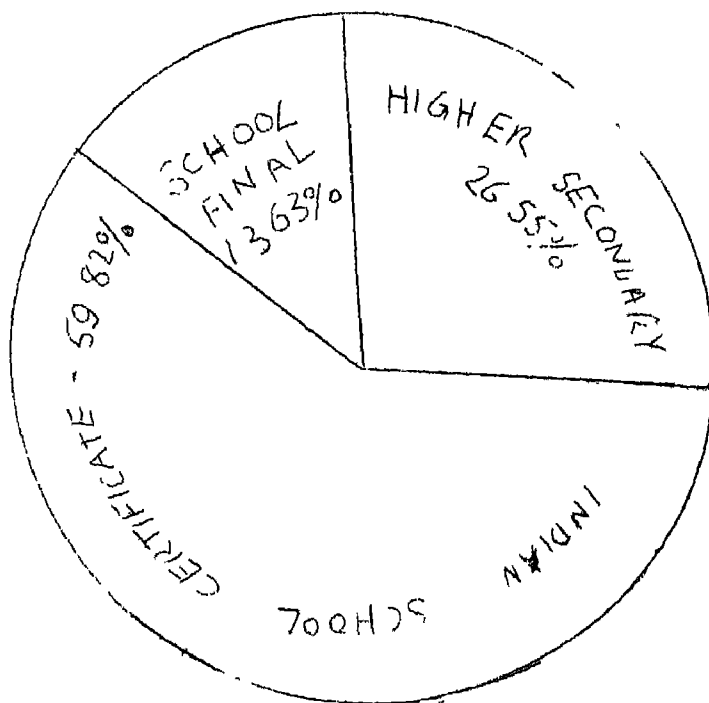


2. Examination: The sample survey consisted of students who were preparing for three types of examinations: the Higher Secondary Examination of the Board of Secondary Education, West Bengal, the Indian School Certificate Examination conducted by the University of Cambridge, Local Examinations Syndicate and the School Final Examination conducted by the Board of Secondary Education, West Bengal.

contd..

Table II. 5.

FREQUENCY DISTRIBUTION OF STUDENTS
IN THE THREE EXAMINATION SECTIONS .



Out of a total of 565 cases in our sample 150 or 26.55% belonged to the Higher Secondary group, 338 or 59.82% to the Indian School Certificate and 77 or 13.63% to the School Final group.

Among the 367 boys in our sample 144 or 39.24% belong to the Higher Secondary, 195 (53.13%) to the Indian School Certificate and 28 (7.63%) to the School Final group. Of the 198 girls 6 (3.03%) belong to the Higher Secondary, 143 (72.22%) to the Indian School Certificate and 49 (24.75%) to the School Final group.

Table II. 6.

Frequency and percentage frequency distribution of students of the two sexes and the total group among the three types of examinations.

<u>Examination</u>	<u>1. Boys</u>		<u>2. Girls</u>		<u>3. Total.</u>	
	N	%	N	%	N	%
1. Higher Secondary.	144	39.24	6	3.03	150	26.55
2. Indian School Certificate.	195	53.13	143	72.22	339	59.82
3. School Final	28	7.63	49	24.75	77	13.63
<hr/>						
---Total:	367	100.00	198	100.00	565	100.00

3. Subject streams: The subject streams represented in our sample were science, humanities, commerce, technical and home science. Of the 565 students 320 or 56.64% took science; 170 or 30.09% humanities; 42 or 7.43% commerce, 8 or 1.42% the technical and 25 or 4.42% home science.

Table II.7.

SEX-WISE PERCENTAGE FREQUENCIES IN 5
SUBJECT STREAMS

Of the 367 boys 246 (67.03%) were in the science stream; 77 (20.98%) in the humanities; 36 (9.81%) in the commerce and 8 (2.18%) in the technical stream. Out of 198 girls 74 (37.37%) take science; 93 (46.97%) take humanities; 6 (3.03%) take commerce; and 25 (12.63%) take home science.

Table II. 8.

Frequency and percentage frequency distribution of the two sexes and the total group in the different subject streams.

Subject streams	Sex					
	1. Boys.		2. Girls.		3. Total.	
	N	%	N	%	N	%
1. Science	246	67.03	74	37.37	320	56.64
2. Humanities	77	20.98	93	46.97	170	30.09
3. Commerce	36	9.81	6	3.03	42	7.43
4. Technical	8	2.18	0	0.00	8	1.42
5. Home Science.	0	0.00	25	12.63	25	4.42
Total:	367	100.00	198	100.00	565	100.00

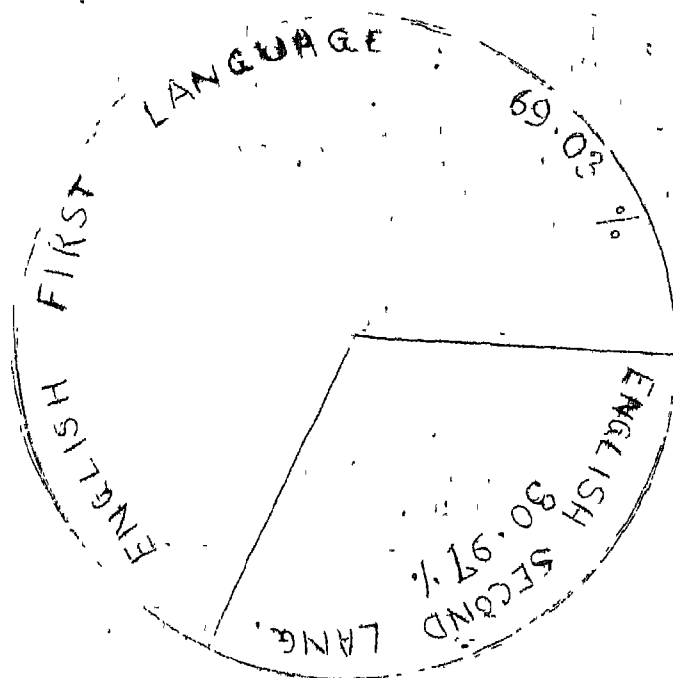
4. English:

All the 565 students did not learn English as a first language. 390 or 69.03% of them took English as a first language while 175 or 30.97% learn it as a second language.

contd..

Table II. 9.

STUDENTS TAKING ENGLISH AS A FIRST
LANGUAGE AND AS A SECOND LANGUAGE.



Of the 367 boys 247 (67.30%) take English as a first language and 120 (32.70%) take it as a second language. Among the 198 girls 143 (72.22%) take English as a first language while 55 (27.78%) take it as a second language.

Table II. 10.

Frequency and percentage of frequency distribution of the students taking English as a first and as a second language among the two sexes and the total group.

English	Sex					
	1. Boys.		2. Girls		3. Total.	
	N	%	N	%	N	%
1. First language.	247	67.30	143	72.22	390	69.03
2. Second language.	120	32.70	55	27.78	175	30.97
Total:	367	100.00	198	100.00	565	100.00

5. Qualifications of teachers teaching English:

The teachers teaching English to the students of our sample were an assortment of trained and untrained teachers with varying degrees of general education. 163 or 28.87 % of students had untrained while 402 or 71.15% of them had trained teachers. 27 or 4.78% students, all boys, had teachers teaching English, who had neither a graduate degree nor a teacher's training of any kind; 136 or 24.07% of students were taught English by teachers who had post-graduate degrees, but no teacher's training; 248 or 43.89% of students had graduate trained teachers and 154 or 27.26% had teachers with post-graduate degrees together with teacher training.

Table II. 11

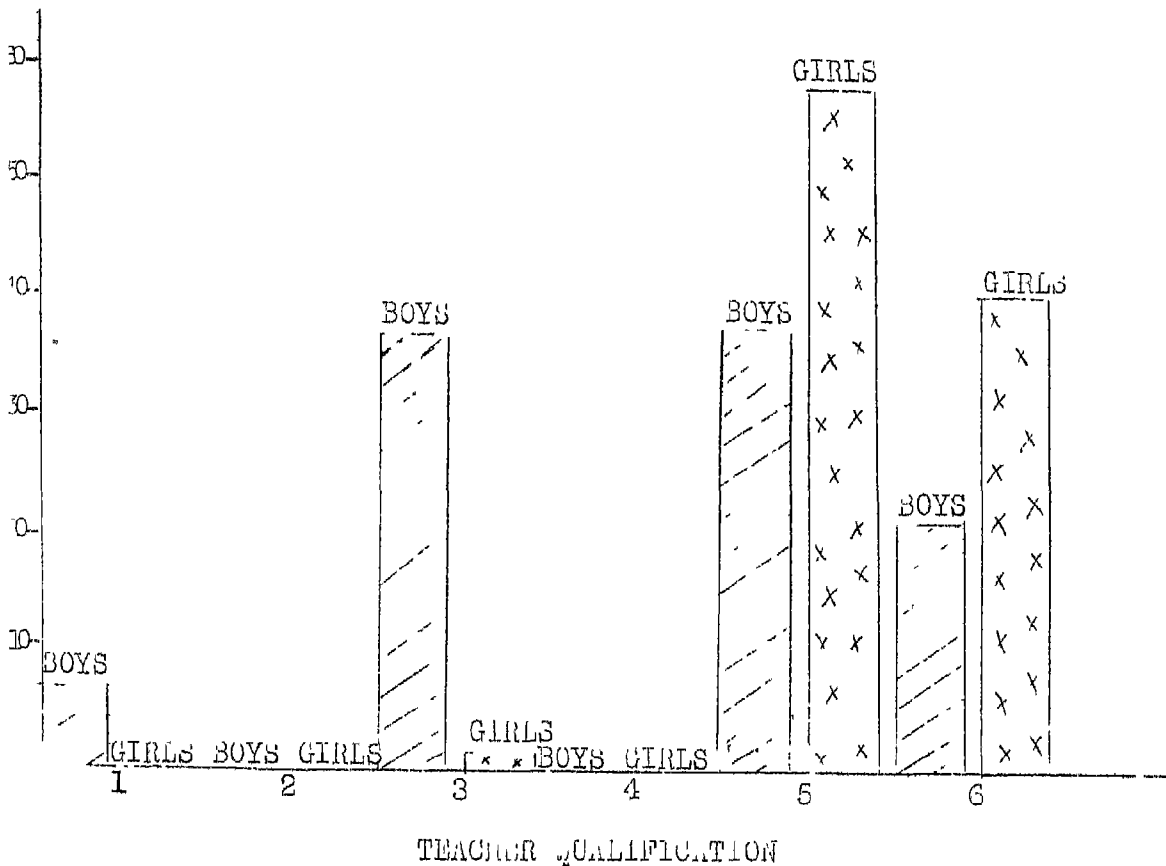
Frequency and percentage frequency distribution of students of the two sexes and the total group taught English by teachers with various qualifications.

<u>Teacher Qualification.</u>	<u>Sex</u>					
	<u>1. Boys</u>		<u>2. Girls.</u>		<u>3. Total.</u>	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
1. Undergraduate untr.	27	7.36	0		27	4.78
2. Graduate untrained.	0	0.00	0		0	0.00
3. Postgraduate untr.	133	36.24	3	1.52	136	24.07
4. Undergraduate tr.	0	0.00	0		0	0.00
5. Graduate trained.	132	35.97	116	58.59	248	43.89
6. Postgraduate trained.	75	20.44	79	39.90	154	27.26
TOTAL:	367	100.00	198	100.01	565	100.00

Among the 367 boys 27 (7.36%) had undergraduate untrained teachers; 133 (36.24%) had postgraduate untrained; 132 (35.97%) had graduate trained and 75 (20.44%) had post-graduate trained teachers. Of the 198 girls 3 (1.52%) had post-graduate untrained; 116 (58.59%) had graduate trained; and 79 (39.90%) had post-graduate trained teachers.

Table II. 12.

SEX-WISE PERCENTAGE FREQUENCY DISTRIBUTION
OF STUDENTS BY TEACHER QUALIFICATION



6. School Type: The schools in our sample can be classified into 3 types on the basis of the monthly fees charged by them. All schools charging Rs.35 and more are classified as type I; those charging between Rs.25 and Rs.35 belong to type II and those charging less than Rs.25 are classified as type III.

Of the 565 students in our sample survey, 198 or 35.04% of them are educated in type I schools; 225 or 39.82% in type II schools and 142 or 25.13% in type III schools. Among the 367 boys, 146 (39.78%) were from type I schools, 157 (42.78%) from type II and 64 (17.44%) from type III schools. On the other hand, of the 198 girls 52 (26.26%) were from type I schools,

contd...

68 (34.34%) from type II and 78 (39.39%) from type III schools.

Table II. 13.

PERCENTAGE FREQUENCY OF STUDENTS
ATTENDING THE THREE TYPES OF SCHOOLS

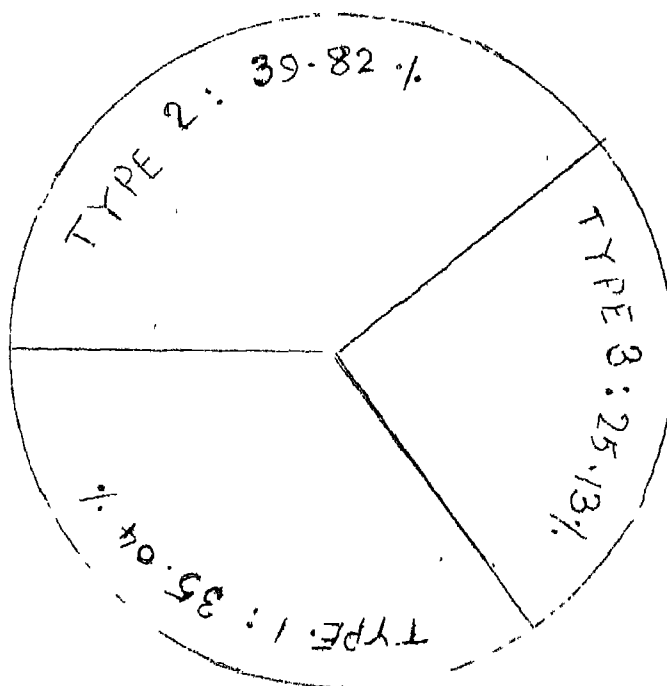


Table II. 14.

Frequency and percentage frequency distribution of the students attending each of the three types of Schools.

School Type	Sex					
	1. Boys		2. Girls.		3. Total.	
	N.	%	N	%	N.	%
1. I	146	39.78	52	26.26	198	35.04
2. II	157	42.78	68	34.34	225	39.82
3. III	64	17.44	78	39.39	142	25.13
Total:	367	100.00	198	99.99	565	100.00

Contd -

7. Father's Profession: The professions followed by the fathers of the students in our sample are many and varied. They ranged from business executives, directors of private companies, Government officials, officers in the armed forces, doctors, lawyers and teachers to clerks, welders & carpenters.

In order to find some order in this variety, all the professions represented in our sample were classified into 9 convenient categories thus :

1. Professional & semi-professional
2. Managerial, executive & proprietorial
3. Sales people & business personnel
4. Clerical workers and related occupations
5. Skilled & semi-skilled personnel & technical workers.
6. Unskilled workers
7. Farmers & farm labourers
8. Military & Police personnel except officers
9. Unclassified.

The detailed classification followed by us is presented in Appendix D.

The distribution of our sample among the 9 categories is presented in Table II. 15.

Table II. 15.

Frequency and percentage frequency distribution of fathers' professions classified sex-wise.

Categories of profession	Sex				Total	
	Boys		Girls			
	N	%	N	%	N	%
1	91	24.80	45	22.73	136	24.07
2	110	29.97	46	23.23	56	27.61
3	103	28.07	83	41.92	186	32.92
4	33	8.99	11	5.56	44	7.79
5	26	7.08	10	5.05	36	6.37
6	00	0.00	00	0.00	00	0.00
7	00	0.00	00	0.00	00	0.00
8	1	0.27	00	0.00	1	0.18
9	3	0.82	03	1.52	6	1.06
Total	367	100.00	198	100.01	565	100.00

On the basis of our classification it was discovered that of the total of 565 students, 136 or 24.07% of them had fathers who could be placed in category 1; 156 or 27.61% of students could be placed in category 2; 186 or 32.92% in category 3; 44 or 7.79% in category 4; 36 or 6.37% in category 5; 1 or 0.18% in category 8 and 6 or 1.06% in category 9.

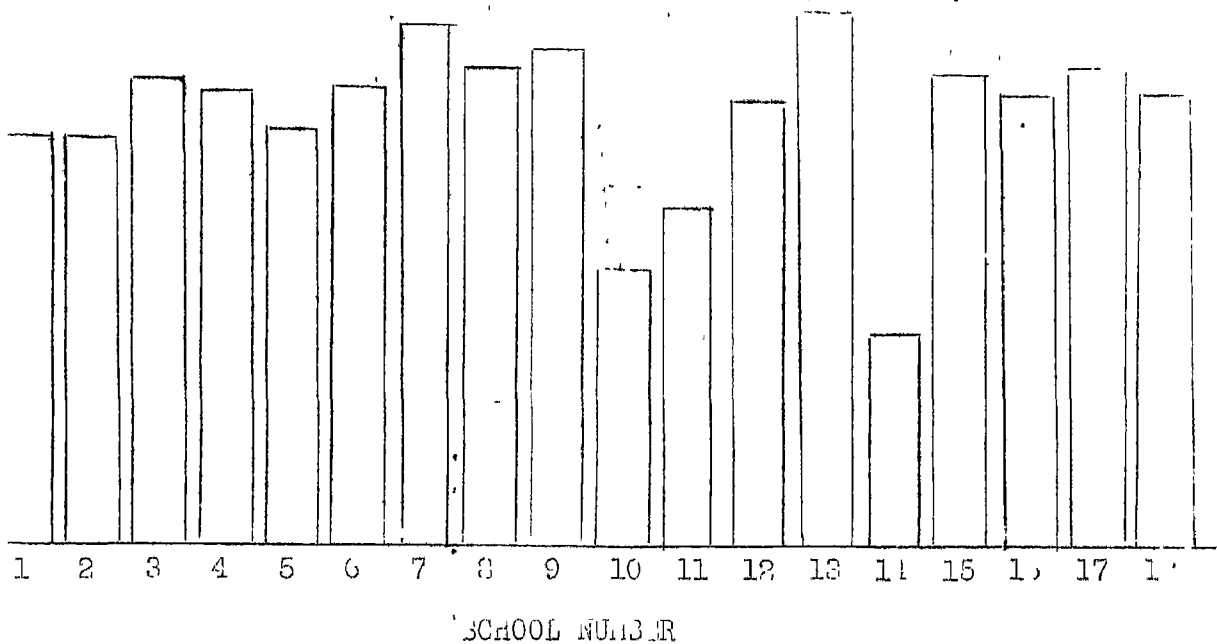
Among the 367 boys, 91 (24.80%) have father whose professions can be classified into category 1; 110 (29.97%) have fathers with profession in category 2; 103 (28.07%) with fathers in category 3; 33 (8.99%) with fathers in category 4; 26 (7.08%) with fathers in professional category 5; 1 (0.27%) with his father in category 8; and 3 (0.82%) in category 9. On the other hand, from a total of 198 girls 45 (22.73%) have fathers who are professional or semi-professional; 46 (23.23%) have fathers in managerial, executive & proprietorial professions; and 83 (41.92%) with fathers who are sales or business people. 11 (5.56%) have fathers in clerical and related professions, 10 (5.05%) have fathers who are skilled, semi-skilled and technical workers and 3 (1.52%) have fathers in unclassified professions.

Number of years spent in an English medium school:

The students spent between 4 to 11 years in an English medium school. The means and SD of the number of years spent by students of each of the 18 schools in English medium schools are displayed in table II. 17., while those of students in the different groups are displayed in Table II. 16. The ² for school variable is 481.2088 and significant at the .01 level.

Table II. 16.

THE AVERAGE NUMBER OF YEARS SPENT IN AN
ENGLISH MEDIUM SCHOOL PRESENTED SCHOOL-WISE



The students preparing for the Indian School certificate examination have been in an English medium school for the longest number of years (average 10.2278) followed by those doing the Higher Secondary (near 8.7333) while those preparing to take the School Final have only been in these type of schools for an average of 6.7143 years. Classified subject-wise we find that the home science group, which consists of girls only, has been in English medium schools for the shortest span of time while these in humanities have been therefor the longest time (average 10.3941 years).

Those students taking English as a first language have been in English medium schools for a significantly greater number of years than those studying it as a second language. Students being

contd...

educated in the schools charging the fees over Rs.35 per month have been in English medium schools for the greatest number of years (average 10.270) followed by those students in schools charging fees between Rs.25 and Rs.35 per month (average 9.3778), while those in schools charging less than Rs.25 per month have been in English medium schools for the shortest length of time with an average of 8.0070 years.

Table II. 17.

Means and SD of the number of years spent in an English medium school presented school-wise.

<u>School No.</u>	<u>Mean</u>	<u>SD</u>
1	8.6296	2.6548
2	8.5833	2.1392
3	9.9655	1.5196
4	9.7059	1.7069
5	8.9048	2.3685
6	9.8889	2.7262
7	11.1290	0.9067
8	10.3864	1.6127
9	10.7619	1.7702
10	5.8929	1.4476
11	7.1837	2.1822
12	9.6190	2.2356
13	11.4706	1.1940
14	4.5333	2.3627
15	10.2667	1.3888
16	9.8378	1.7166
17	10.2941	1.9331
18	9.8922	1.5524

$$\chi^2 = 481.2088 \quad \text{DF} = 17 \quad P \leq .01$$

Table II. 18.

Means, SD, X^2 , df, and significance of number of years spent in an English-medium-school by students classified on the basis of sex, examination, subject, English, teacher qualification and school type.

Criterion of classification	Sub-groups	N	Means	SD	X^2	df	P
1. Sex	Boys	367	9.1744	2.3558			
	Girls	198	9.6818	2.3942	5.843	1	*
2. Exam	Higher Secondary	150	8.7333	2.5316			
	Indian Sch. Certi	338	10.2278	1.7788			
	School Final	77	6.7143	2.0440	212.876	2	**
3. Subject	Science	320	9.0250	2.4211			
	Humanities	170	10.3941	1.9321			
	Commerce	42	9.1429	1.9466			
	Technical	8	8.8750	2.2604			
	Home Science	25	6.9600	2.2712	81.966	4	**
4. English	First Language	4390	10.0897	1.8073			
	Second ,,	175	7.7086	2.6685	115.563	1	**
5. Teacher qualification.	Undergrad-untr.	27	8.6296	2.6548			
	Grad-untr.	0	0.0000	0.0000			
	Postgrad-untr.	136	8.9044	2.5202			
	Undergrad-tr.	0	0.0000	0.0000			
	Grad-tr.	248	9.8065	2.2457			
	Postgrad-tr.	154	9.1429	2.2804	17.602	3	**
6. School type.	I	198	10.2879	1.5805			
	II	225	9.3778	2.3503			
	III	145	8.0070	2.7024	87.353	2	**

* $P \leq .05$
 ** $P \leq .01$

CHAPTER - III

TESTS AND VARIABLES

In this chapter information about the choice of tests used, details of their administration and the scores and variables yielded by them is presented.

TESTS ADMINISTERED

Selection of Tests

In all, four reasoning tests were administered. Of the four one was a verbal reasoning test and three were factorial non-verbal reasoning tests, namely incomplete sets, combinations and analogies. The verbal reasoning test took 60 minutes to administer while each of the non-verbal tests took 30 minutes.

The 1960 revision of the Cooperative English test, form 2.B, was selected for testing language. It consists of two tests (reading comprehension and English expression) each requiring 45 minutes. All the reasoning and language tests were group tests.

The Cooperative English test is a comprehensive test measuring all the different aspects of achievement in English like reading comprehension, mechanics of expression and effectiveness of expression. It yields separate scores on the different aspects of language enabling us to diagnose specific areas of strength and weakness and to make comparisons.)

The material is interesting to the students and representative of the kind of reading material the students deal with in school. The test is easy to administer. It also yields a comprehensive score of the students' overall level of skill in the fundamentals of English comprehension and expression. Finally, it is well-standardized. However, some words in the test have American spellings. Our students are more used to the English spelling as given in the Oxford Dictionary. Hence the English spellings were used by us for words with American spellings. (The Wechsler Memory Scale was used for testing memory: The Test is simple, brief and quick to administer. Besides it is standardized on normal subjects.)

Administration

The language, reasoning and memory tests were administered in three sessions by two research assistants especially trained for the purpose. The reasoning tests were administered on one day, the Cooperative English Tests on the second occasion and the memory test on the third occasion. The particular tests used in each session with the time taken and the break in each testing session are shown below:

<u>Test Session</u>		<u>Tests</u>	<u>Time</u>
I	..	1. Incomplete sets	30 min
		2. Combinations	30 min
		Break	20 min
		3. Verbal reasoning	60 min
		4. Analogies	30 min
II	..	1. Reading comprehension	45 min
		Break	10 min
		2. English expression	45 min
III	..	Memory scale administered individually	15 min per student

All the testing in the schools was undertaken from the middle of July till the end of September 1965, that is, in the second term of the school year. The first group testing session for administering the reasoning tests was undertaken in all the schools from mid-July to August. The tests were administered to 825 students in 19 schools. After that all the schools had their second session of group testing with the language tests in August. 739 students took the language tests. Finally the memory scale was administered to 688 students from the end of August till the end of September. The group tests were administered to 23 groups with a max of 40 students per group.

Order of Administration

The reasoning tests were administered in two sessions, with an interval between them, on the same day, beginning with two non-verbal tests, a simple one followed by a difficult one. The first session was followed by a second, which included a verbal test to break the monotony and ended with the last of the simpler non-verbal tests. The non-verbal tests can be arranged in order of difficulty-value thus:

1. Incomplete sets;
2. analogies and
3. combination.

The above order of administration was selected for the following reasons:

- 1) Incomplete sets were administered first, because it is simple tests which gave the students a mental set. It did not discourage them as the students were able to solve the items quite easily.
- 2) Combination was placed second. Being the most difficult of the non-verbal tests it could be handled after the students had developed a mental set, and they had warmed up to the task.

- 3) Verbal reasoning was administered third. In order to avoid monotony setting in, the verbal reasoning test was sandwiched between the non-verbal ones. It was given after a short interval to avoid forcing the subjects to make a quick mental change.
- 4) The analogies test was administered last as it was a simple one. At the end of the testing session the subjects may have been somewhat tired, so an easier test was given last of all.

Cooperative English Tests

The Cooperative English Tests were administered in almost all the schools in the morning. The students were therefore fresh and tended to answer with ease and enthusiasm.

It was found that a mere explanation on the mode of marking the answers badly was sufficient before starting the test. All the students understood the examples and answered without any help.

In many schools the second part of the reading comprehension test was not completed by the students. The students were unable to read and answer the passages and questions swiftly.

In all the schools the students were requested to ignore those words which were spelt in the American way in the past where correction of sentences was required.

It was noticed that the students did not get so mentally fatigued as with the reasoning tests. Possibly the shorter testing session and the absence of abstract figures were the principal reasons for this.

The students all answered at an average pace. In some schools where the students were more proficient at English they answered briskly and had little difficulty. But in other schools where English is not offered as the first language and which do not have a very high standard of English, the students experienced difficulty and could not answer all the questions briskly.

Quotations are presented from the field work observations made by the test administrators to give an idea of the administration of the reasoning tests.

School No. 11

The students were provided single desks and the class room was in moderately quiet surroundings. Students

were quite cooperative and they took the test with interest. Comprehension in general was good as just one explanation of the example was enough to make them carry on with the test. In verbal reasoning also very few questions regarding the instructions were asked as here no explanation is given for the directions.

School No.8

The school hall was used for the purpose of testing. The students were extremely well disciplined and well behaved. The proctors kept the situation normal at all times. Each student was seated at a single desk set apart from the others. They were all fully equipped with stationery. All the examples were illustrated on the blackboard and one illustration or explanation sufficed. Very few questions were asked and the boys worked at a normal rate finishing early in some tests and not in others. The boys were extremely courteous and well behaved. Interest was shown as to the outcome of the tests and the aim of administering these.

Administration of the Memory Scale

In general, in all the schools the students were tested the whole day long. But no significant difference was observed in the performance of students tested in the morning and those tested in the afternoon. Hence, the fatigue factor may be ruled out.

The students were quite interested in the test. They preferred it to the other tests. The place of testing in each school was determined by the accommodation the school could provide. When only one tester administered the test, she was often provided with a separate room away from noise and free of other disturbances, like students peeping in etc. When two testers worked simultaneously the schools often provided a large room with two different desks, but they were quite separated and the student could not benefit or feel disturbed by another student taking the test.

SCORES AND VARIABLES

The scores obtained by students in each of the reasoning tests were converted into percentage items correctly answered and maintained separately for each of the 4 tests. Thus the reasoning tests yielded 4 variables.

The language tests (Cooperative English tests) yielded six variables in the form of converted scores, computed according to the instructions printed in the manual as follows: vocabulary, level of comprehension, speed of comprehension, total reading score, English expression and total English score.

For the memory scale the total score was used as one single variable. For school achievement we obtained five variables namely average percentage marks in English, Indian language, all core subjects, elective subjects and the total.

The marks obtained by the students in the promotion examination of class 9 held in December 1964 and the half-yearly tests held in May-June 1965 were collected from the schools. English was offered as a first or second language; the fees charged by the school, the qualifications of teachers teaching English to Class 10, parents' profession, student's age and the number of years he has spent in an English medium school.

Since the analysis was conducted by using the electronic computer, all the information available for each student was transferred to IBM punch cards using the following format:

<u>Variable</u> <u>No</u>	<u>N a m e</u>
1.	Student identification number (1 - 565)
2.	Name of school (1 - 18)
3.	Sex (1 - Boys, 2 - Girls)
4.	Examination section (1 - H.Sec., 2 - Ind. sch. Cert., 3 - S.F)
5.	Subject stream (1 - Sc., 2 - Hum., 3 - Com., 4 - Tech., 5 - Home Sc.)
6.	English (1 - 1st lang., 2 - second lang.,)
7.	Teacher qualifications (1 - Undergrad - untrained, 2 - Grad-untrained, 3 - postgrad-untrained, 4 - undergrad-trained, 5 - grad-trained, 6 - post-grad-trained)
8.	School type (1 - Rs 35, 2 - Rs 25-35, 3 - below Rs 25 per month)
9.	Father's profession (1 - 9)
10.	Age in months
11.	Number of years in an English medium school
12.	Incomplete sets
13.	Combinations
14.	Verbal reasoning
15.	Analogies
16.	Vocabulary
17.	Level of comprehension
18.	Speed of comprehension
19.	Total reading score
20.	English expression
21.	Total English score
22.	Memory
23.	English
24.	Indian language
25.	Core subjects
26.	Elective subjects
27.	Total school achievement

CHAPTER - IV

COMPARISONS

Section 0: Introduction.

One of the major objectives of the present investigation is to try and trace some of the causes of the differences that appear among the scores on the tests taken by the students. In view of this, it is necessary to compare the scores of the students grouped on different bases. Seven criteria are used for classification as follows: school number, sex, subject groups, examination stream, English learnt as a first or second language, the qualification of the teacher teaching English to class 10, and the fees charged by the school. The hypothesis set up for testing is that the means for the subgroups for each of the variables are not equal. ² was used to test the difference between the means.

The salient findings of the analysis are as follows:

The schools in our sample differ significantly from each other on the language, reasoning and memory tests. There are no sex differences but the differences are striking when the students are classified on the basis of the school leaving examination for which they prepare (Indian School Certificate, Higher Secondary and School Final).

The students of the different subject streams especially the girls perform significantly differently on the language, memory and reasoning tests. The boys and girls of the science and humanities groups produce high mean scores while the commerce-technical boys and commerce-home science girls attain low scores on our tests. The highest mean scores on the reasoning variables are held by science students; the highest language scores by humanities and the highest memory scores by the commerce group.

There is a significant difference in the performance of the students learning English as a first language and those learning it as a second language on all the reasoning, language and memory variables. Those learning English as a first language fare

contd...

contd....

better than their counterparts, who learn it as a second language.

The performance of the students from different types of schools (those paying high, moderate and low fees) on all the language, reasoning and memory variables is significantly different.

The differences in performance on the language, reasoning variables but it is not so on memory for the boys among the different pupils may therefore be traced to the school leaving examination for which a student is preparing; his subject stream whether he learns English as a first or second language and the school in which he studies.

The means, standard deviations and the results of the comparisons have been summarized in Tables IV.1.1.1 to IV.7.3.1. Tables IV.1.1.1 to IV.1.3.1 display the means, standard deviations, and chi squares for the 18 schools on each of the reasoning, language, memory variables and school achievements. The findings of the comparisons for the 18 schools have been summarized in Table IV.1.4 for the reasoning, language, memory and total school achievement variables. Table IV. 2.1 exhibits the means, standard deviations and chi squares of the reasoning variables presented by sex and for the total group. The means, standard deviation and chi squares are presented by sex and total groups for the language variables in table IV.2.2 and for memory in table IV.2.3. The results of the comparisons of students belonging to the 3 examination sections are displayed by sex and total groups in tables IV. 3.1.1 to IV. 3.3.1 while those of students belonging to the five subject streams are available in tables IV. 4.1.1 to IV.4.3.1. The means, standard deviations and chi squares of students learning English as a first language and those learning it as a second language are presented by sex and for the total group for the reasoning variables in table IV. 5.1, the language variables in table IV. 5.2 and for memory in table IV.5.3. The results of the comparisons of students of each sex and the total group on the basis of the qualifications possessed by teachers who teach English to class 10 for 11 variables are found in tables IV. 6.1.1 to IV. 6.3.1. Finally, the findings

of the comparisons of students from schools classified on the basis of fees charged by them are displayed by sex and total groups in tables IV. 7.1.1 to IV.7.3.1.

Discussion of the results of the comparisons are presented in 7 sections. Each section deals with the comparisons based on one criterion of classification. Hence, section 1 deals with all comparisons based on groups classified on the basis of school number. In section 2 are found all comparisons of groups prepared with sex, in section 3 with examination, in section 4 with subject, in section 5 English, in section 6 teacher's qualifications and 7 school type as the criterion of classification.

Section IV. 1. - School Number.

All the 18 schools in our sample have been compared with each other on the reasoning, vocabulary memory and school achievement variables.

1.1. Reasoning:

Table IV, 1, 1.1 discloses that the means of the different schools for incomplete sets range from 13.4444 to 25.0833. With 17 degrees of freedom the χ^2 of 89.8173 is significant at the one percent level.

Table IV. 1.1.1
Means, SD and χ^2 for the 18 schools
on the Incomplete sets test.

School No.	N	Mean	SD
1	27	13.4444	6.9779
2	12	25.0833	6.8002
3	29	22.5172	7.0448
4	34	19.3824	7.6889
5	42	21.1429	6.9095
6	9	19.8889	5.8962
7	31	22.5484	8.0275
8	44	22.5909	5.9784
9	21	22.9524	6.4622
10	28	18.2500	6.7168
11	49	19.1837	7.0672
12	21	21.3810	7.8040
13	17	23.0588	6.0437
14	15	19.2667	4.8092
15	30	22.7333	5.8477
16	37	21.5676	6.1492
17	17	19.7059	8.0642
18	102	24.9314	6.9116

$$\chi^2 = 89.8173$$

$$df = 17$$

From table II.1.1.2 we notice that the means of the different schools for combinations range from 11.2857 to 20.5862. The χ^2 of 135.1951 with 17 degrees of freedom is significant at the one percent level.

Table IV -1.1.2

Means, SD and χ^2 for the 18 schools on the
Combinations test.

School No.	N	Mean	SD
1	27	9.8148	4.6828
2	12	14.9167	4.6808
3	29	20.5862	6.2340
4	34	16.9706	5.2102
5	42	15.4524	5.5515
6	9	16.7778	6.4769
7	31	17.2903	6.9986
8	44	14.6591	5.9043
9	21	17.2857	5.8728
10	28	11.2857	6.3407
11	49	12.3061	5.2068
12	21	20.1429	6.9508
13	17	17.7647	5.3416
14	15	14.8667	3.2014
15	30	16.3000	6.1055
16	37	13.0811	4.7156
17	17	13.0000	5.3578
18	102	18.0916	7.1838

$$\chi^2 = 135.1951, \quad df = 17$$

$$P \leq .01$$

The means of all the 18 schools for the verbal reasoning test are shown in table III.1.1.3. These range from 57.5181 to 78.0476 and the χ^2 of 179.8847 is significant at the .01 level.

Table IV. 1.1.3.

Means, SD and χ^2 for the 18 schools on the Verbal Reasoning test.

School No.	N	Mean	SD
1	27	57.5185	13.7850
2	12	70.1667	6.3749
3	29	73.7931	9.0644
4	34	74.3824	7.2193
5	42	78.0476	6.8207
6	9	71.1111	7.4602
7	31	76.2258	6.5240
8	44	72.5000	7.7210
9	21	73.7619	7.0502
10	28	63.0357	9.7119
11	49	64.1224	11.4725
12	21	71.4762	8.2325
13	17	70.8235	5.5966
14	15	67.4667	13.9325
15	30	74.5667	5.7427
16	37	69.0541	7.5764
17	17	66.0000	7.8516
18	102	76.8529	8.6233

$$\chi^2 = 179.8847, \quad df = 17$$

$$P \leq .01$$

The means, standard deviations and χ^2 for the 18 schools on the analogies test may be seen in table III.1.1.4. The means range from 17.3704 to 32.0833. The χ^2 is 92.0575 and significant at the .1 level.

Table IV.1.1.4
Means, SD and χ^2 for the 18 schools
on the Analogies Test.

School No.	N	Mean	SD
1	27	17.3704	10.2673
2	12	32.0833	3.5463
3	29	31.1724	6.5919
4	34	31.5000	5.0541
5	42	31.0238	7.4753
6	9	29.4444	7.0413
7	31	29.6774	5.6013
8	44	29.8864	5.6617
9	21	30.7619	4.8688
10	28	24.1429	9.1913
11	49	25.8571	7.8272
12	21	31.1905	5.0106
13	17	28.6471	4.5882
14	15	32.8667	5.4021
15	30	29.0667	8.3104
16	37	28.6436	7.3933
17	17	28.7647	5.3855
18	102	31.7255	6.4916

$$\chi^2 = 92.0575, \quad df = 17$$

1.2. Language:

The means, standard deviations and χ^2 for all the 18 schools on vocabulary are displayed in Table III.1.2.1. The means range from 132.5510 for school 11 to 155.3810 for school 9. The χ^2 is 454.3151 and significant at the one percent level.

Table IV.1.2.1

Means, SD and χ^2 for 18 schools
on Vocabulary.

School No.	N	Mean	SD
1	27	134.6667	6.4290
2	12	140.7500	7.0843
3	29	142.0345	10.4798
4	34	147.0000	11.1197
5	42	145.5476	9.8154
6	9	141.5556	4.5241
7	31	154.9032	11.5851
8	44	146.2046	10.8136
9	21	155.3810	9.7711
10	28	133.1071	5.3476
11	49	132.5510	5.8066
12	21	143.1905	10.1212
13	17	146.1765	7.4616
14	15	134.0667	5.2340
15	30	149.4667	8.1270
16	37	140.8649	9.5130
17	17	141.6471	7.7455
18	102	151.0980	11.6984

$$\chi^2 = 454.3151, \quad df = 17$$

$$P \leq .01$$

The means, standard deviations and χ^2 for each of the 18 schools for level of comprehension are presented in table IV.1.2.2. The means on this variable range from 131.2857 for school 10 to 156.0476 for school 9. The χ^2 is 403.1236 and is significant at the .01 level.

Table IV.1.2.2.

Means, SD and χ^2 for the 18 schools
on Level of Comprehension.

School No.	N	Mean	SD
1	27	136.9259	6.1879
2	12	141.4167	5.3143
3	29	145.6897	10.0724
4	34	147.4412	9.4189
5	42	146.7143	10.3700
6	9	142.8889	5.6262
7	31	155.6129	8.1308
8	44	146.2046	10.8241
9	21	156.0476	10.0260
10	28	131.2857	6.8184
11	49	134.5306	7.8976
12	21	147.8095	10.4455
13	17	146.4706	8.4025
14	15	133.9333	8.9998
15	30	151.6000	8.6895
16	37	139.7027	8.3856
17	17	142.7059	7.5985
18	102	150.5294	10.5419

$$\chi^2 = 403.1236, \quad df = 17$$

$$P \leq .01$$

Table IV.1.2.3 reveals the means, standard deviations and χ^2 for each of the 18 schools in our sample on speed of comprehension. The means range from 134.6071 for school 10 to 151.9677 for school 7.

χ^2 is 339.7416 and significant at the .01 level.

Table IV. 1.2.3

Mean, SD and χ^2 for 18 schools on
Speed of Comprehension.

School No.	N	Mean	SD
1	27	134.7407	4.8883
2	12	139.3333	6.5363
3	29	143.3793	8.6410
4	34	143.0000	9.2355
5	42	145.0000	7.4290
6	9	137.5556	5.1663
7	31	151.9677	9.1704
8	44	144.1364	8.2231
9	21	148.8571	7.0130
10	28	134.6071	5.9381
11	49	134.6132	4.3398
12	21	142.7143	8.7567
13	17	143.0588	9.6618
14	15	136.4000	5.9978
15	30	145.1000	6.8961
16	37	138.2973	7.1390
17	17	138.3529	6.9701
18	102	147.0098	8.8335

$$\chi^2 = 339.7416, \quad df = 17$$

$$P \leq .01$$

On total reading score the means, standard deviations and χ^2 are seen in table IV 1.2.4. The mean is highest for school 7 (153.5161) and lowest for school 11 (133.7959). χ^2 is 487.5121 and significant at the one percent level.

Table IV. 1.2.4

Mean, SD and χ^2 for 18 schools
on Total Reading Score.

School No.	N	Mean	SD
1	27	134.9630	4.7570
2	12	140.4167	5.0572
3	29	143.0690	9.8363
4	34	145.2647	9.4162
5	42	145.5238	8.0334
6	9	139.8889	4.1751
7	31	153.5161	9.7049
8	44	145.4091	9.0210
9	21	152.4286	7.7064
10	28	134.1071	4.3536
11	49	133.7959	4.8275
12	21	143.2857	9.2074
13	17	144.7647	7.5733
14	15	135.4000	4.4692
15	30	147.5333	6.7614
16	37	139.8378	7.6034
17	17	140.1765	6.9217
18	102	149.3431	9.4095

$$\chi^2 = 487.5121, \quad df = 17$$

$$P \leq .01$$

Table IV. 1.2.5 shows the means standard deviations and χ^2 for the 18 schools on English expression. The mean for school 1 (136.4074) is the lowest among the different schools while that for school 7 (153.4839) is the highest. The χ^2 is 365.6640 and significant at the .01 level.

Table IV. 1.2.5.
Mean, SD and χ^2 for 18 schools on
English Expression.

School No.	N	Mean	SD
1	27	136.4074	7.2637
2	12	144.1667	6.6059
3	29	142.5517	9.0805
4	34	146.6177	9.2033
5	42	150.2381	18.3741
6	9	141.0000	5.6372
7	31	153.4839	7.6701
8	44	147.5909	8.4915
9	21	153.4286	7.3262
10	28	138.0357	5.9492
11	49	137.4898	6.8693
12	21	143.9524	8.7965
13	17	152.2353	6.0735
14	15	137.1333	5.6671
15	30	148.7667	8.0857
16	37	142.2162	6.6784
17	17	142.1765	10.1474
18	102	152.8431	8.7287

$$\chi^2 = 365.6640, \quad df = 17$$

$$P \leq .01$$

For Total English score, the means, standard deviations and χ^2 are presented in table IV.1.2.6. Here we find that school 7 has the highest mean score (153.7742) while school 11 has the lowest mean score (135.9184). The χ^2 is 475.6471 and significant at .01 level.

Table IV. 1.2.6.

Means, SD and χ^2 for 18 schools on
Total English score.

School No.	N	Mean	SD.
1	27	136.0000	5.4840
2	12	142.5000	5.2836
3	29	143.1379	9.2129
4	34	146.1765	8.9590
5	42	146.9524	7.4257
6	9	140.7778	4.2629
7	31	153.7742	8.4308
8	44	146.7955	8.1926
9	21	153.1905	6.9392
10	28	136.3214	4.9212
11	49	135.9184	5.1580
12	21	144.0000	8.4007
13	17	148.7647	6.4764
14	15	136.5333	4.4702
15	30	148.4333	6.9604
16	37	141.2162	6.0988
17	17	141.3529	8.0069
18	102	151.3529	8.5871

$$\chi^2 = 475.6471, \quad df = 17$$

$$P \leq .01$$

1.3. Memory:

Table IV. 1.3.1 shows the means, standard deviations and χ^2 for each of the 18 schools on memory. The mean scores for the schools range from 54.5333 for school 14 to 66.5484 for school 7. The χ^2 is 103.3785 and significant at the .01 level.

Table IV. 1.3.1.

Mean, SD and χ^2 for 18 schools
on Memory.

School No.	N	Mean	SD
1	27	63.5926	8.9743
2	12	65.6667	5.7927
3	29	61.4483	6.8812
4	34	65.9706	7.0062
5	42	61.4762	7.5316
6	9	58.5556	4.8788
7	31	66.5484	7.3302
8	44	58.2727	6.5240
9	21	64.3810	4.8744
10	28	56.1071	3.9517
11	49	59.0612	6.5665
12	21	61.0476	7.1413
13	17	64.7647	5.9362
14	15	54.5333	10.4427
15	30	65.4333	6.7166
16	37	59.5405	7.3433
17	17	60.4706	7.8074
18	102	63.7647	6.6527

$$\chi^2 = 103.3785, \quad df = 17$$

$$P \leq .01$$

The marks attained at school by the students of the different schools in our sample differ significantly is shown in table IV. 1.4.1.

Table IV. 1.4.1.

Mean, SD and χ^2 for 18 schools
on Total School Achievement

School No.	N	Mean	SD
1	27	160.3407	30.4512
2	12	226.8417	27.3572
3	29	198.4655	37.5208
4	34	192.1824	33.9645
5	42	208.4691	25.5360
6	9	226.4667	30.1249
7	31	227.9936	29.5240
8	44	192.6273	35.5974
9	21	227.2191	32.0724
10	28	147.6250	30.4472
11	49	164.5674	32.9233
12	21	216.5476	30.1324
13	17	198.8529	24.2099
14	15	183.1600	38.9847
15	30	199.3933	20.2338
16	37	173.5000	30.0478
17	17	186.9588	20.3429
18	102	192.9294	37.4671

$$\chi^2 = 277.4590, \quad df = 17$$

$$P \leq .01$$

In considering the differences in school achievement it may be remembered that there is a subjective element in marking besides the real differences that exist between the performance of students.

All the chi squares for comparisons of the 18 schools on each of the reasoning, language and memory variables are summarized in the table IV. 1.5. The data denotes that performance of students from the different schools in our sample differs significantly on each one of these variables as is evidenced by the chi-square test results.

Table IV. 1.5.

χ^2 for Comparisons of 18 schools on
Reasoning, Language, Memory and
School Achievement.

Variable	χ^2	P
Incomplete sets	89.8173	**
Combinations	135.1951	**
Verbal Reasoning	179.8847	**
Analogies	92.0575	**
Vocabulary	454.3151	**
Level of Comprehension	403.1236	**
Speed of Comprehension	339.7416	**
Total Reading Score	487.5121	**
English Expression	365.6640	**
Total English Score	475.6471	**
Memory	103.3785	**
Total School Achievement	277.4590	**

** P \leq .01

Section IV.2 -- Sex.

Out of a total of 565 students we had 367 boys and 198 girls. Comparisons were made between the sexes on each of the reasoning, language and memory variables.

2.1. Reasoning:

The means, standard deviations and chi-squares for the reasoning variables are displayed sexwise and for the total group in Table IV.2.1. The means for the boys and girls for each of the four reasoning variables are similar. The chi square for incomplete sets is 0.125; for combination 0.149; for verbal reasoning 3.926 and for analogies 1.089. Out of the four only the χ^2 for verbal reasoning is just significant at the .05 level. Here the mean for the boys (72.2180) is higher than that for the girls (70.4899).

Table IV. 2.1

Means, SD and χ^2 of the Reasoning Variables presented by Sex and for the Total Group.

Variable	Sex	N	Mean	SD	χ^2 (df = 1)
Incomplete Sets.	Boys	367	21.5967	7.4256	0.125
	Girls	198	21.3687	7.2565	
	Total	565	21.5168	7.367	
Combinations	Boys	367	15.6049	6.6324	0.149
	Girls	198	15.8283	6.5251	
	Total	565	15.6832	6.5958	
Verbal Reasoning	Boys	367	72.2180	10.7286	3.926*
	Girls	198	70.4899	9.4092	
	Total	565	71.6124	10.3185	
Analogies	Boys	367	29.4605	8.0545	1.089
	Girls	198	28.7929	6.7862	
	Total	565	29.2265	7.6407	

* $P \leq .05$

2.2. Language:

Table IV 2.2 shows the means, standard deviations and chi squares for the two sexes and the total group for each of the language variables. In testing the significance between the means of the variables for two sexes the chi squares for each of the six variables were as follows: 0.192 for vocabulary; 3.915 for level of comprehension; 0.012 for speed of comprehension; 0.071 for total reading score; 0.055 for English expression and 0.034 for total English score. None of these chi squares is significant except the one for level of comprehension which is just significant at the five percent level. The mean score for girls was higher than the mean score for boys on level of comprehension.

Table IV. 2.2.

Means, SD and χ^2 for the Language
Variables by Sex and for the Total Group.

Variable	Sex	N	Mean	SD	χ^2 (df=1)
Vocabulary	Boys	367	144.2071	11.6863	0.192
	Girls	198	144.6667	11.9295	
	Total	565	144.3681	11.7741	
Level of Com- prehension.	Boys	367	144.3951	11.2977	3.915*
	Girls	198	146.4091	11.6705	
	Total	565	145.1009	11.4702	
Speed of Com- prehension	Boys	367	142.4360	8.9835	0.012
	Girls	198	142.5253	9.5625	
	Total	565	142.4673	9.1906	
Total Reading Score	Boys	367	143.5858	9.7560	0.071
	Girls	198	143.8283	10.2149	
	Total	565	143.6708	9.9199	
English Expression	Boys	367	146.2480	11.3692	0.055
	Girls	198	146.0303	9.9051	
	Total	565	146.1717	10.8791	
Total English Score.	Boys	367	145.0436	9.3388	0.034
	Girls	198	145.2071	9.6050	
	Total	565	145.1009	9.4333	

* $P \leq .05$

2.3. Memory:

From the data presented in table IV. 2.3 it is evident that the mean for boys is 61.5150 while that for girls is 62.6566 on memory. The chi square is 2.921 and not significant.

2.4. Concl.

The data presented in table IV. 2.1 denote that the means for the two sexes for incomplete sets, combinations and analogies are equal, while those on verbal reasoning are just significantly higher for the boys than for the girls. From the information presented in Table IV, 2.2 we may conclude that the means for boys and girls are equal for vocabulary, speed of comprehension, total reading score, English expression, and Total English score, but the mean for girls is just significantly higher than that for boys on level of comprehension. The boys and girls perform equally well on the memory variable.

Table IV. 2.3

Means, SD and χ^2 for Memory presented
by Sex and the Total Group.

Group	N	Mean	SD	χ^2 (df=1)
Boys	367	61.5150	8.1464	2.921
Girls	198	62.6566	7.2470	
Total	565	61.9150	7.8619	

Section IV.3 - Examination.

The students in our sample could be classified on the basis of the examination for which they prepared. The students of each sex and the total group of each of the examination sections were compared with each other on each of the reasoning, language and memory variables.

3.1. Reasoning:

In table IV 3.1.1. the means, standard deviations and results of the tests of significance between the means of the three examination sections are presented sexwise and for the total group on incomplete sets. Among the boys group the mean of the ISC students is 22.9128, that of the Higher Secondary students is 20.4653 and of the School Final section is 18.2500. The χ^2 for the three sections 16.869 and significant at the .01 level. Among the girls the mean of the ISC students is 22.1958, while those of the Higher Secondary and School Final sections are 19.5000 and 19.1837 respectively. The chi square is 6.881 and significant at the .05 level. In the total groups with the boys and girls put together, the mean of the ISC students is 22.6095, that of the Higher Secondary students is 20.4267 and of the School Final students 18.8442. The chi square is 22.433 and significant at the .01 level.

The results show that the means of the three examination sections differ significantly among the boys and just significantly among the girls. The mean of the ISC students is highest followed by the Higher Secondary set while the School Final students produce the lowest mean score among the three groups on incomplete sets.

Table IV. 3.1.1.

Means, SD and χ^2 of the three examination streams presented by sex and total groups for incomplete sets.

Group	Exam.	N	Mean	SD	χ^2 (df=2)
Boys	H.Sec.	144	20.4653	7.6448	16.869**
	Ind.Sch.Cert.	195	22.9128	7.0607	
	S.F.	28	18.2500	6.7168	
Girls	H.Sec.	6	19.5000	9.8446	6.881 *
	Ind.Sch.Cert.	143	22.1958	7.0187	
	S.F.	49	19.1837	7.0672	
Total	H.Sec	150	20.4267	7.7471	22.433**
	Ind.Sch.Cert.	338	22.6095	7.0519	
	Sch.Final	77	18.8442	6.9564	
* P	χ^2	.05			
**P	χ^2	.01			

3.1.2. The results of the analysis of data in the form of means, standard deviations and chi squares for combinations are displayed in table IV.3.1.2 separately for boys, girls and the total group. Among the boys it may be noted that the mean for the ISC students is 16.7590, that for the Higher Secondary students is 14.8819 while that for the School Finals is 11.2857. The chi square is 20.541 and significant at the one present level. When considering the girls group it is discovered that the ISC students have a mean of 17.0629, the Higher Secondary girls have a mean of 15.1667 and the School Final girls get 12.3061. The test of significance shows that these three means differ highly with a $\chi^2 = 20.541$ which is significant at the .01 level. For the total group on combinations the mean of the ISC students (16.8876) is highest, followed by that for the Higher Secondary set (14.8933) while the mean for the school finals (11.9351) is the lowest among the three examination sections. The chi square is 46.394 and significant at the .01 level.

The chi squares for each of the sex groups are significant at the .01 level. Also, in each sex group the ranking of the means for the three examination sections follows the same pattern, with the ISC obtaining the highest score followed by the Higher Secondary and the School Final obtaining the lowest score. Hence, we may conclude that there is a definite difference between the means of the students of the three examination sections on combinations.

Table IV. 3.1.2

Means, SD and χ^2 of the three examination streams presented by sex and total groups for combinations.

Group	Exam	N	Mean	SD	χ^2 (df=2)
Boys	H.Sec.	144	14.8819	5.9131	20.541**
	Ind.Sch.Cert.	195	16.7590	6.8409	
	Sch.Final	28	11.2857	6.3407	
Girls	H.Sec.	6	15.1667	3.7602	26.455**
	Ind.Sch.Cert.	143	17.0629	6.5784	
	Sch.Final	49	12.3061	5.2068	
Total	H.Sec	150	14.8933	5.8425	46.394**
	Ind.Sch.Cert.	338	16.8876	6.7328	
	Sch.Final	77	11.9351	5.6668	

** P \leq .01

3.1.3. The means, standard deviations and chi squares of the three examination sections are presented separately for boys, girls and the total group for verbal reasoning in table IV. 3.1.3. The means for the three examination sections of the boys group in decreasing order of magnitude are as follows: ISC 73.7026; Higher Secondary 71.9931 and School Final 63.0357. The chi square is 30.509 and significant at the .01 level; The means for the girls group presented in decreasing order of magnitude are as follows: ISC 72.8392; Higher Secondary 66.5000 and School Final 64.1224. The chi square is 26.983 and significant at the .01 level. The means for the total group are 73.3373 for the ISC; 71.7733 for the Higher Secondary and 63.7273 for the School Final.

Table IV. 3.1.3.

Means, SD and χ^2 of the three examination streams presented by sex and total groups for verbal Reasoning.

Group	Exam	N	Mean	SD	χ^2 (df=2)
Boys	H.Sec.	144	71.9931	12.3308	30.509 **
	Ind.Sch.Cert.	195	73.7026	8.7439	
	Sch.Final	28	63.0357	9.7119	
Girls	H.Sec.	6	66.5000	8.5586	26.986 **
	Ind.Sch.Cert.	143	72.8392	7.3709	
	School Final	49	64.1224	11.4725	
Total	H.Sec.	150	71.7733	12.2497	53.388 **
	Ind.Sch.Cert.	338	73.3373	8.2022	
	Sch.Final	77	63.7273	10.8779	

From the above, it may be noted that when the means for verbal reasoning are placed in descending order of magnitude, the I.SC group has the highest score followed by the Higher Secondary with the School Final bringing up the rear with the smallest score. This pattern is consistently evident in each of the sex groups and for the total group. Furthermore, all three chi squares are significant at the .01 level. Hence we conclude that the students of the three examination sections produce significantly different mean scores on the verbal reasoning test and that the ISC is the best group while the School Final is the poorest.

3.1.4. Table IV 3.1.4 shows the means, standard deviations and chi squares of the three examination sections for analogies presented separately for each sex and for the total group. The means for the three examination sections of the boys group presented in descending order of magnitude are as follows: ISC 30.1846; Higher Secondary 29.5139 and School Final 24.1429. The chi square is 11.274 and significant at the one percent level. The means of the girls group are as follows: 29.8182 for ISC; 28.3333 for Higher Secondary and 25.8571 for the School Final. The chi square is 10.606 and significant at the .01 level. The means of the total group follow the same pattern as those for each of the sex groups, namely, the highest score is obtained by the ISC group (30.0296) followed by the Higher Secondary students (29.4667) with the School Final receiving the lowest score among the three (25.2338). The chi square is 22.075 and significant at the .01 level. This means that the means of the three examination streams differ significantly for each of the sex groups and for the total group for the analogies test.

Table IV. 3.1.4..

Means, SD and χ^2 of the three examination streams presented by sex and total groups for analogies.

Group	Exam	N	Mean	SD	χ^2 (df=2)
Boys	H.Sec.	144	29.5139	8.9085	11.274 **
	Ind.Sch.Cert	195	30.1846	6.8393	
	Sch.Final	28	24.1429	9.1913	
Girls	H.Sec.	6	28.3333	3.5434	10.606 **
	Ind.Sch.Cert.	143	29.8182	6.1833	
	Sch.Final	49	25.8571	7.8272	
Total	H.Sec.	150	29.4667	8.7603	22.075 **
	Ind.Sch.Cert.	338	30.0296	6.5722	
	Sch.Final	77	25.2338	8.3897	

** $P \leq .01$

From the results of the comparisons of the students from the three examination sections for each of the four reasoning variables it is evident that the three groups differ significantly. A study of the means of the three examination sections reveals that the means of the Indian School Certificate group are highest, those of the Higher Secondary examination are somewhat lower, while the means of the School final students are the lowest on every one of the four variables in the case of the boys and girls. It may be recalled that three out of the four reasoning tests used are non-verbal tests. Hence, there is no question about language having played a part in producing the results.

3.2. Language:

The means, standard deviations and chi squares of the three examination sections are presented by sex and for total groups for the language variables in tables IV.3.2.1, IV.3.2.2, IV.3.2.3, IV.3.2.4, IV.3.2.5 and IV. 3.2.6. -

Table IV.3.2.1 summarizes the results for vocabulary. From this table it is noted that the mean for the boys is highest among the ISC groups (147.823) followed by the Higher Secondary students (141.3750), with the School Final receiving the lowest score (133.1071). The chi square for the three groups of boys is 125.898 and significant at the .01 level. Among the girls group the means are as follows: 149.0909 for the ISC; 138.1667 for the Higher Secondary and 132.5510 for the School Final. The chi square for the three groups girls is 186.473 and significant at the .01 level. The three means of the total groups follow the same pattern of ranking as those of the boys and girls groups. The ISC students obtain the highest score with 148.3994; the Higher Secondary second with 141.2467 and the School Final obtain the lowest mean score with 132.7533. The chi square for these three groups is 308.200 and significant at the .01 level. We may therefore conclude that the means of the three examination sections differ significantly for vocabulary.

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Table IV. 3.2.1.

Means, SD and χ^2 of the three examination streams presented by sex and total groups for Vocabulary.

Group	Exam	N	Mean	SD	χ^2 (df=2)
Boys	H.Sec.	144	141.3750	10.1365	
	Ind.Sch.Cert.	195	147.8923	11.8258	125.898**
	Sch.Final	28	133.1071	5.3476	
Girls	H.Sec.	6	138.1667	6.5170	
	Ind.Sch.Cert.	143	149.0909	10.5862	186.473**
	Sch.Final	49	132.5510	5.8066	
Total	H.Sec.	150	141.2467	10.0365	
	Ind.Sch.Cert.	338	148.3994	11.3334	308.200**
	Sch.Final	77	132.7533	5.6502	

** $P \leq .01$

3.2.2. Table IV. 3.2.2 summarizes the means, standard deviations and chi squares of the three examination sections for level of comprehension. The means of the boys group are as follows: 146.7231 for the ISC, 143.7917 for the Higher Secondary and 131.2357 for the School Final. The chi square for these three means is 106.222 and significant at the .01 level. Among the girls group the mean for the ISC students is 150.7343, that for the Higher Secondary students is 140.3333 and for the School Final group 134.5306. The chi square is 142.017 and significant at the one percent level. The three means of the total group, when placed in descending order of magnitude, occupy the same rank order as those of the boys and girls groups. The ISC group have the highest mean score (148.4201) followed by the Higher Secondary group (143.6533) while the School final receive the lowest score (133.3507). The chi square for these three means is 205.844, and significant at the .01 level, indicating that the means are significantly different for level of comprehension.

Table IV. 3.2.2.

Means, SD and χ^2 of the three examination streams presented by sex and total groups for level of comprehension.

Group	Exam.	N	Mean	SD	χ^2 (d.f.=2)
Boys	H.Sec.	144	143.7917	10.7029	
	Ind.Sch.Cert.	192	146.7231	10.8899	106.222*
	Sch.Final.	28	131.2357	6.8181	
Girls	H.Sec.	6	140.3333	3.7714	
	Ind.Sch.Cert.	143	150.7343	9.9001	142.017**
	Sch.Final.	49	134.5306	7.8976	
Total	H.Sec.	150	143.6533	10.5357	
	Ind.Sch.Cert.	338	148.4201	10.6682	205.844**
	Sch.Final.	77	133.3507	7.6833	

**P \leq .01

3.2.3. Table IV. 3.2.3 summarizes the results for speed of comprehension. The means of the boys group are as follows: ISC 144.3487; Higher Secondary 141.3681 and School Final 134.6071. The chi square is 70.293 and significant at the .01 level. The means of the girls group are as follows: ISC 145.5944; School Final 134.6122 and Higher Secondary 134.0000. The chi square is 132.510 and significant at the .01 level. Since the means of the Higher Secondary and the School Final are almost identical, this chi square discloses the difference between the ISC and the other two examination sections. The three means of the total group are: 144.8757 for ISC, 141.0733 for Higher Secondary and 134.6104 for School Final. The chi square is 183.919 and significant at the .01 level.

Table IV. 3.2.3.

Means, SD and χ^2 of the three examination streams presented by sex and total groups for Speed of Comprehension.

Group	Exam	N	Mean	SD	χ^2 (df=2)
Boys	H.Sec.	144	141.3681	8.0783	70.293**
	Ind.Sch.Cert.	195	144.3487	9.3139	
	Sch.Final.	28	134.6071	5.0381	
Girls	H.Sec.	6	134.0000	2.7080	132.510**
	Ind.Sch.Cert.	143	145.5944	9.1660	
	Sch.Final	49	134.6122	4.9398	
Total	H.Sec.	150	141.0733	8.0640	183.919**
	Ind.Sch.Cert.	338	144.8757	9.2721	
	Sch.Final.	77	134.6104	4.9757	

**P \leq .01

3.2.4. The results of the total reading score are summarized in table IV. 3.2.4 for each sex and for the total group. Among the boys group the means are as follows: ISC 146.3744; Higher Secondary 141.6528 and School Final 134.1071. The chi square is 126.676 and significant at the .01 level. The means for the girls group are as follows: ISC 147.5874; Higher Secondary 136.1667 and School Final 133.7959. The chi square is 182.885 and significant at the one percent level. Since the means of the girls and boys groups assume the same ranks, the means of the total group also follow a similar pattern. The mean of the ISC students (146.8876) is the highest, the mean of the Higher Secondary students (141.4333) is second while that of the School Final group (133.9091) is the lowest. The chi square is 301.902 and significant at the .01 level indicating that the means of the three examination sections in the case of boys, girls and total group differ significantly for total reading score.

Table IV. 3.2.4.

Means, SD and χ^2 of the three examination streams presented by sex and total groups for Total Reading Score.

Group.	Exam.	N	Mean	SD	χ^2 (df=2)
Boys	H.Sec.	144	141.6528	8.4354	
	Ind.Sch.Cert.	195	146.3744	10.0214	126.676**
	Sch.Final.	28	134.1071	4.3536	
Girls	H.Sec.	6	136.1667	4.0172	
	Ind.Sch.Cert.	140	147.5874	9.2050	
	Sch.Final.	49	133.7959	4.8275	
Total	H.Sec.	150	141.4333	8.3734	
	Ind.Sch.Cert.	338	146.8876	9.7030	301.901**
	Sch.Final	77	133.9091	4.6632	

** P \leq .01

3.2.5. Table IV. 3.2.5 summarizes the results for English expression. The means of the boys of the three examination sections are as follows: ISC 148.4718; Higher Secondary 144.8333 and School Final 138.0357. The chi square is 62.327 and significant at the .01 level. The means of the girls group are: 149.4895 for the ISC; 137.4898 for the School Final and 133.3333 for the Higher Secondary. The chi square is 116.423 and significant at the .01 level. Though the means of both the boys and girls of the ISC are the highest, the School Final boys and the Higher Secondary girls have the lowest means.

For the total group, however, the mean of the ISC students (148.9024) is highest followed by that of the Higher Secondary students (144.3733) while the School Finals have the lowest mean score (137.6883) on English expression. With a chi square of 154.930 these three means differ significantly.

Table IV. 3.2.5.

Means, SD and χ^2 of the three examination streams presented by sex and total groups for English Expression.

Group	Exam.	N	Mean	SD	χ^2 (df=2)
Boys	H.Sec.	144	144.8333	13.0629	
	Ind.Sch.cert.	195	148.4718	9.8010	62.327**
	Sch.Final.	28	138.0357	5.9492	
Girls	H.Sec.	6	133.3333	6.5235	
	Ind.Sch.Cert.	143	149.4895	8.6120	116.423**
	Sch.Final	49	137.4898	6.8693	
Total	H.Sec.	150	144.3733	13.0612	
	Ind.Sch.Cert.	338	148.9024	9.3305	154.930**
	Sch.Final	77	137.6883	6.5550	

** $P \leq .01$

3.2.6. A summary of the results for total English score is presented in table IV. 3.2.6. The mean of the ISC boys is 147.6821; the Higher Secondary boys 143.1667 and the School Final boys 136.3214. Since the chi square for these three boys groups is 98.168 and significant at the .01 level, the means differ due to reasons other than chance. The means of the girls group for total English Score are as follows: ISC 148.8182; School Final 135.9184 and Higher Secondary 135.0000. The chi square of 173.544 proves that these means differ significantly. Since the means of the School Final and Higher Secondary girls are almost identical, the high chi square denotes that the mean of the ISC girls differs significantly from these two. The means of the total group for total English score are as follows: ISC 148.1627; Higher Secondary 142.8400 and School Final 136.0649. With a chi square of 254.328 these three means differ significantly.

Table IV. 3.2.6.

Means, SD and χ^2 of the three examination streams presented by sex and total groups for Total English Score.

Group	Exam.	N	Mean	SD	χ^2 (df=2)
Boys	H.Sec.	144	143.1667	8.3333	98.168**
	Ind.Sch.Cert.	195	147.6821	9.4284	
	Sch.Final	28	136.3214	4.9212	
Girls	H.Sec.	6	135.0000	5.0662	173.544**
	Ind.Sch.Cert.	143	143.8182	8.4005	
	Sch.Final	49	135.9184	5.1520	
Total	H.Sec.	150	142.8400	8.3818	254.328**
	Ind.Sch.Cert.	338	148.1627	9.0253	
	Sch.Final	77	136.0649	5.0768	

**P \leq .01

3.3. Memory:

The means, standard deviations and chi squares for memory are displayed sexwise and for the total group in table IV.3.3.1. The means of the boys group are as follows: 62.3333 for the ISC; 61.4583 for Higher Secondary and 56.1071 for School Final. With a chi square of 10.373 these three means differ significantly. The three means of the girls group also differ significantly with a chi square of 26.088. They are 64.1189 for ISC; 59.0612 for School Final and 57.1667 for Higher Secondary. The three examination sections of the total group produce means as follows: ISC 63.0888; Higher Secondary 61.2867 and School Final 57.9870. The chi square is 27.544 and significant at the .01 level.

Table IV. 3.3.1.

Means, SD and χ^2 of the three examination streams presented by sex and total groups for Memory.

Group	Exam.	N	Mean	SD	χ^2 (df=2)
Boys	H.Sec	144	61.4583	8.2697	
	Ind.Sch.Cert.	195	62.3333	7.4363	10.373**
	Sch.Final	28	56.1071	9.9547	
Girls	H.Sec.	6	57.1667	5.8713	
	Ind.Sch.Cert.	143	64.1189	6.9760	26.088**
	Sch.Final	49	59.0612	6.5665	
Total	H.Sec.	150	61.2867	8.2303	
	Ind.Sch.Cert.	338	63.0888	7.2986	27.544**
	Sch.Final	77	57.9870	8.0928	

**P \leq .01

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Concl.

The trend of the results of the comparisons made with the examination used as the criterion of classification consistently shows that there is a significant difference between the students taking the ISC, Higher Secondary and the School Final. There is a significant difference in the means of the students of the three examination sections whether one considers the girls, the boys or the total group for every one of the reasoning, language and memory variables. Furthermore, the rank order of the three means of the examination sections for every variable among each of the two sexes and the total group is as follows: the ISC students have the highest mean followed by the Higher Secondary with the School Final student producing the lowest mean. The difference between the means of the ISC and Higher Secondary students is larger than that between the Higher Secondary and School Final students.

Section IV. 4. - Subject Streams

The subjects in our sample can be classified into the following five streams on the basis of the elective subjects they chose: Science, humanities, commerce, technical and home science. Comparisons of students of these five subject streams were conducted sexwise and for the total group for each of the reasoning, language and memory variables.

4.1. Reasoning:

The means, standard deviations and chi squares of the reasoning variables are presented in tables IV. 4.1.1, IV.4.1.2, IV.4.1.3 and IV.4.1.3.

In table IV.4.1.1, the results of the analysis for incomplete sets are displayed for boys, girls and the total group. The means of the four subject streams selected by the boys are as follows: technical 28.1250; science 22.5122; humanities 19.3377 and commerce 18.7222. The chi square is 25.717 and significant at the .01 level.

The means of the four subject streams of the girls are as follows: Science 24.9459; humanities 20.0108; commerce 19.5000 and home science 16.2800. The chi-square is 45.242 and significant at the .01 level. The means of the five subject streams of the boys and girls put together are as follows: technical 28.1250; science 23.0750; humanities 19.7059; commerce 18.8333 and home science 16.2800. The chi square is 60.057 and significant at the .01 level.

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Table IV. 4.1.1.

Means, SD and \bar{X} of the 5 subjects presented by sex and total groups for Incomplete sets.

Group	Subject	N	Mean	SD	\bar{X}	df
Boys	Science	246	22.5122	6.9394		
	Humanities	77	19.3377	7.6830		3
	Commerce	36	18.7222	7.7625	25.717**	
	Technical	8	28.1250	5.7758		
	Home Science.	-	-	-		
Girls	Science	74	24.9459	6.2318		
	Humanities	93	20.0108	6.7434		3
	Commerce.	6	19.5000	9.8446	45.242**	
	Technical	-	-	-		
	Home Science.	25	16.2800	6.1807		
Total	Science	320	23.0750	6.8984		
	Humanities	170	19.7059	7.1920		4
	Commerce	42	18.8333	8.0974	60.057**	
	Technical.	8	28.1250	5.7758		
	Home Science.	25	16.2800	6.1807		

** P < .01

4.1.3. Table IV. 4.1.3 summarizes the results of the verbal reasoning test. The four means of the boys group differ significantly producing a chi square of 17.774. The means are 73.8618 for science; 73.0000 for technical; 69.3889 commerce and 68.2078 humanities. The means of the girls group, on the other hand, are 74.0000 for science; 71.2903 for humanities; 66.5000 for commerce and 58.0800 for home science. With a chi square of 73.743 which is significant at the .01 level, these means differ not merely due to chance alone. Among the total group the means of the five subject streams are as follows: science 73.8938; technical 73.000; humanities 69.8941; commerce 68.9762 and home science 58.0800. The chi square is 97.907 and significant at the .01 level.

Table IV. 4.1.2.

Mean, SD and χ^2 of the 5 subjects presented by sex and total groups for Combinations.

Group	Subject	N	Mean	SD	χ^2	df
Boys	Science	246	16.0732	6.7861		
	Humanities	77	14.4935	6.2432		3
	Commerce	36	15.0833	6.5506	4.947	
	Technical	8	14.2500	3.4551		
	Home Science	-	-	-		
Girls	Science	74	17.7568	6.9122		
	Humanities	93	16.0968	5.9389		3
	Commerce	6	15.1667	3.7602	111.200**	
	Technical	-	-	-		
	Home Science	25	9.2800	2.6309		
Total	Science	320	16.4625	6.8524		
	Humanities	170	15.3706	6.1308		4
	Commerce	42	15.0952	6.2290	128.452**	
	Technical	8	14.2500	3.4551		
	Home Science	25	9.2800	2.6309		

**P \leq .01

4.1.2. The results of the boys, girls and total group for the combinations test are presented in table IV.4.1.2. The means of the four subject streams of the boys are as follows: science 16.0732; commerce 15.0833; humanities 14.4935 and technical 14.2500. The chi square is 4.947 and not significant with 3 degrees of freedom indicating that the four means are equal and differ due to chance factors. The four means of the girls group are as follows: science 17.7568; humanities 16.0968; commerce 15.1667 and home science 9.2800. With a chi square of the magnitude of 111.200 the means of the four subject groups among the girls differ significantly. The means of the five subject streams with the boys and girls put together similarly differ significantly with a chi square of 128.432. The means of the total group are as follows: Science 16.4625; humanities 15.3706; commerce 15.0952; technical 14.2500 and home science 9.2800.

Table IV. 4.1.3.

Mean, SD and χ^2 of the 5 subjects presented by sex and total groups on Verbal Reasoning.

Group	Subject	N	Mean	SD	χ^2	df.
Boys	Science	246	73.8618	9.9779		
	Humanities	77	68.2078	11.7078		3
	Commerce	36	69.3889	11.1237	17.774**	
	Technical	8	73.0000	8.2614		
	Home Science.	-	-	-		
Girls	Science	74	74.0000	9.0390		
	Humanities	93	71.2903	6.9970		3
	Commerce	6	66.5000	8.5586	73.743**	
	Technical	-	-	-		
	Home Science	25	58.0800	7.9343		
Total	Science	320	73.8938	9.7690		
	Humanities	170	69.8941	9.5511		4
	Commerce	42	68.9762	10.8419	97.907**	
	Technical	8	73.0000	8.2614		
	Home Science.	25	58.0800	7.9343		

**P \leq .01

4.1.4. The results of the analogies tests for the five subject streams are summarized in table IV.4.1.4. The means of the boys group for this variable are as follows: Science 31.1016; technical 31.5000; humanities 26.2338 and commerce 24.6944. The chi square is 30.587 and significant at the .01 level. The chi square for the four means of the girls group is 41.502 and significant at the .01 level, the means being 31.8243 for science; 28.2796 for humanities; 28.3333 for commerce and 21.8400 for home science. The means of the total group are as follows: technical 31.5000; science 31.2688; humanities 27.3529; commerce 25.2143 and home science 21.8400. With a chi square of the magnitude of 68.303 these five means differ significantly.

Table IV. 4.1.4.

Mean, SD and χ^2 of the 5 subjects presented by sex and total groups for Analogies.

Group	Subject	N	Mean	SD	χ^2	df
Boys	Science	246	31.1016	6.7156	30.587**	3
	Humanities	77	26.2338	9.1551		
	Commerce	36	24.6944	10.3811		
	Technical	8	31.5000	2.8723		
	Home Science	-	-	-		
Girls	Science	74	31.8243	4.9000	41.502**	3
	Humanities	93	28.2796	6.2085		
	Commerce	6	28.3333	3.5434		
	Technical	-	-	-		
	Home Science	25	21.8400	8.4080		
Total	Science	320	31.2688	6.3494	68.303**	4
	Humanities	170	27.3529	7.7516		
	Commerce	42	25.2143	9.7871		
	Technical	8	31.5000	2.8723		
	Home Science	25	21.8400	8.4080		

**P \leq .01

4.2. Language:

The means, standard deviations and chi squares for the language variables are displayed sex-wise and for the total group in tables IV.4.2.1; IV.4.2.2; IV.4.2.3; IV.4.2.4; IV.4.2.5 and IV.4.2.6.

4.2.1. A summary of the results of the vocabulary variable are displayed in table IV.4.2.1. The chi square (11.835) being significant at the .01 level the means of the boys group differ significantly. The means are 147.0390 for humanities; 144.1250 for technical; 143.9715 for science and 139.7778 for the commerce students. The means for the girls group on the other hand are as follows: humanities 148.0323; science 146.0000; commerce 138.1667 and home science 129.7600. The chi square is 205.872 and significant at the .01 level. Among the total group the five means of the various subject streams differ significantly with a chi square of 246.342. The means are 147.5824 for humanities; 144.4406 for science; 144.1250 for technical; 139.5476 for commerce and 129.7600 for home science.

Table IV. 4.2.1.

Mean, SD and χ^2 of the 5 subjects presented by sex and total groups for Vocabulary.

Group	Subject	N	Mean	SD	χ^2	df
Boys	Science	246	143.9715	11.8440		
	Humanities	77	147.0390	11.5009		3
	Commerce	36	139.7778	9.9585	11.835**	
	Technical	8	144.1250	8.0535		
	Home Science	-	-	-		
Girls	Science	74	146.0000	12.3420		
	Humanities	93	148.0323	9.9184		3
	Commerce	6	138.1667	6.5170	205.872**	
	Technical	-	-	-		
	Home Science	25	129.7600	4.5103		
Total	Science	320	144.4406	11.9915		
	Humanities	170	147.5824	10.6758		4
	Commerce	42	139.5476	9.5598	246.342**	
	Technical	8	144.1250	8.0535		
	Home Science.	25	129.7600	4.5103		

**P ≤ .01

4.2.2. Table IV. 4.2.2. summarizes the results of level of comprehension. It is noted from this table that the four means of the boys group are equal and differ due to chance. The chi square being 7.228 it is not significant with 3 degrees of freedom. The means of the boys group are as follows: science 145.3862; humanities 142.8961; technical 141.7500 and commerce 141.4167. However, the four means of the girls groups differ significantly with a chi square of 120.300 and $P \leq .01$. The means are 149.1075 for humanities; 148.5000 for science; 140.3333 for commerce and 131.6400 for home science. The means of the total group are as follows: humanities 146.2941; science 146.1063; technical 141.7500; commerce 141.2619 and home science 131.6400. The chi square is 99.876 and significant at the .01 level.

Table IV. 4.2.2.

Mean, SD and χ^2 of the 5 subjects presented by sex and total groups for Level of Comprehension.

Group	Subject	N	Mean	SD	χ^2	df
Boys	Science	246	145.3862	11.7685		
	Humanities	77	142.8961	10.0410		3
	Commerce	36	141.4167	9.6476	7.228	
	Technical	8	141.7500	10.4253		
	Home Science	-	-	-		
Girls	Science	74	148.5000	11.9379		
	Humanities	93	149.1075	9.4669		3
	Commerce	6	140.3333	3.7714	120.300**	
	Technical	-	-	-		
	Home Science	25	131.6400	7.0364		
Total	Science	320	146.1063	11.8923		
	Humanities	170	146.2941	10.2105		4
	Commerce	42	141.2619	9.0530	99.876**	
	Technical	8	141.7500	10.4253		
	Home Science	25	131.6400	7.0364		

**p \leq .01

4.2.3. The results for speed of comprehension are displayed separately for each sex and the total group in Table IV.4.2.3. The means of the boys group are as follows: science 142.7764; humanities 142.5844; commerce 140.5556 and technical 139.0000. The chi square is 4.317 and not significant indicating that the four means differ due to chance factors. The means of the girls group, on the other hand, differ significantly. The chi square is 122.178 and significant at the one percent level. The means for the girls are 144.4194 for humanities; 143.9730 for science; 134.0000 for commerce and 133.2400 for home science. The means of the total group are as follows: humanities 143.5882; science 143.0531, commerce 139.6191; technical 139.0000 and home science 133.2400. The chi square is 121.103 and significant at the .01 level indicating that the five means differ from each other and not merely due to chance alone. Since the means of the boys groups are alike while those of the girls differ, the difference in the means of the total group can be traced to the girls.

Table IV. 4.2.3.

Mean, SD and χ^2 of the 5 subjects presented by sex and total groups for Speed of Comprehension.

Group	Subject	N	Mean	SD	χ^2	d.f.
Boys	Science	246	142.7764	9.1004	4.317	3
	Humanities	77	142.5844	9.1420		
	Commerce	36	140.5556	7.7403		
	Technical	8	139.0000	7.0711		
	Home Science	-	-	-		
Girls	Science	74	143.9730	10.0054	122.178**	4
	Humanities	93	144.4194	8.7609		
	Commerce	6	134.0000	2.7030		
	Technical	-	-	-		
	Home Science	25	133.2400	4.1015		
Total	Science	320	143.0531	9.3310	121.103**	4
	Humanities	170	143.5882	8.9872		
	Commerce	42	139.6191	7.5937		
	Technical	8	139.0000	7.0711		
	Home Science	25	133.2400	4.1015		

**P \leq .01

4.2.4. Table IV, 4.2.4, summarizes the results for total reading score by sex and for the total group. The mean scores of the boys group are as follows: humanities 145.0649; science 143.6342; technical 141.8750 and commerce 140.4722. The chi square being 7.244 and not significant, these means differ merely due to chance factors. The means of the girls groups are 146.4301 for humanities; 145.2705 for science; 136.1667 for commerce and 131.7200 for home science. Since the chi square is 192.264 and significant at the .01 level we conclude that these four means scores differ from each other. The means of the total group are 145.8118 for humanities; 144.0125 for science; 141.8750 for technical; 139.8571 for commerce and 131.7200 for home science. The chi square is 230.206 and significant at the .01 level. This significant difference in the five mean scores can be traced to the girls.

Table IV, 4.2.4.

Mean, SD and χ^2 of the 5 subjects presented by sex and total groups for Total Reading Score.

Group	Subject	N	Mean	SD	χ^2	df
Boys	Science	246	143.6342	9.9480	7.244	3
	Humanities	77	145.0649	9.6339		
	Commerce	36	140.4722	8.3383		
	Technical	8	141.8750	7.0256		
	Home Science	-	-	-		
Girls	Science	74	145.2703	10.7280	192.264**	
	Humanities	93	146.4301	8.6115		
	Commerce	6	136.1667	4.0172		
	Technical	-	-	-		
	Home Science	25	131.7200	3.7365		
Total	Science	320	144.0125	10.1572	230.206**4	
	Humanities	170	145.8118	9.1144		
	Commerce	42	139.8571	8.0107		
	Technical	8	141.8750	7.0256		
	Home Science	25	131.7200	3.7365		

**P \leq .01

4.2.5. Table IV.4.2.5 summarizes the results for English expression by sex and for the total groups. The means of the boys group are 148.2597 for humanities; 146.0041 for science; 144.3333 for commerce and 143.0000 for technical while the chi square is 8.350 and significant at the .05 level. For the girls group the means are as follows: 148.5591 for humanities; 147.9595 for science, 133.9600 for home science and 133.3333 for commerce. The chi square is 146.248 and significant. It may be noted here that the two means for commerce and home science are almost identical while those for humanities and science are almost alike. The significantly high chi square is therefore due to the difference between the science and humanities on the one hand and the commerce - home science groups on the other. The means of the total group are 148.4235 for humanities; 146.4563 for science; 143.0000 for technical; 142.7619 for commerce and 133.9600 for home science. The chi square is 137.858 and significant at the .01 level.

Table IV. 4.2.5.

Mean, SD and χ^2 of the 5 subjects presented by sex and total groups for English Expression.

Group	Subject	N	Mean	SD	χ^2	df
Boys	Science	246	146.0041	11.7315		
	Humanities	77	148.2597	10.7973		
	Commerce	36	144.3333	10.4377	8.35	2
	Technical	8	143.0000	4.1833		
	Home Science	-	-	-		
Girls	Science	74	147.9595	9.6940		
	Humanities	93	148.5591	8.0462		
	Commerce	6	133.3333	6.6235	146.248	4
	Technical	-	-	-		
	Home Science	25	133.9600	5.3477		
Total	Science	320	146.4563	11.3233		
	Humanities	170	148.4235	9.3938		
	Commerce	42	142.7619	10.6901	137.858	4
	Technical	8	143.0000	4.1833		
	Home Science	25	133.9600	5.3477		

** $P \leq .01$

4.2.6. The means, standard deviations and chi squares of the five subject streams are presented sexwise and for the total group for total English score in table IV.4.2.6. The means of the boys groups for humanities, science, commerce and technical are 146.9221, 144.8781, 142.6944 and 142.6250 respectively. The chi square of 7.097 is not significant. The means of the girls groups are as follows: humanities 147.7419; science 146.9189; commerce 135.0000 and home science 133.1600. The chi square is 216.741 and significant at .01 level. It may be noted here that the four means of the girls can be conveniently grouped together into two sets on the basis of similarity of size. The mean scores of the humanities and science are almost the same size while those of the commerce and home science are alike. Hence, the significant difference between the four means as evidenced by the huge chi square can be explained as due to the difference between the science - humanities and commerce - home science groups.

Table IV. 4.2.6.

Mean, SD and χ^2 of the 5 subjects presented by sex and total groups for Total English Score.

Group	Subject	N	Mean	SD	χ^2	df
Boys	Science	246	144.8781	9.2649	7.097	3
	Humanities	77	146.9221	9.6816		
	Commerce	36	142.6944	9.0395		
	Technical	8	142.6250	5.0975		
	Home Science	-	-	-		
Girls	Science	74	146.9189	9.7907	216.741**	3
	Humanities	93	147.7419	7.7638		
	Commerce	6	135.0000	5.0662		
	Technical	-	-	-		
	Home Science	25	133.1600	3.7166		
Total	Science	320	145.3500	9.4285	239.104**	4
	Humanities	170	147.3706	8.6947		
	Commerce	42	141.5952	8.9975		
	Technical	8	142.6250	5.0975		
	Home Science	25	133.1600	3.7168		

**p \leq .01

4.3. Memory:

Table IV. 4.3 summarizes the results of the memory test for the five subject streams by sex and for the total group. From it we notice that the means of the boys group are 63.0000 for commerce; 62.2338 for humanities; 61.1870 for science and 58.0000 for technical. The chi square is 3.906 and not significant. As against this, the means of the girls are as follows: Science 64.2162, humanities 63.3871; commerce 57.1667 and home science 56.6400. Furthermore, the chi square is 32.354 and significant at the .01 level.

The means of the total group for the five subject streams are 62.8647 for humanities; 62.1667 for commerce; 61.8875 for science; 58.0000 for technical and 56.6400 for home science. The difference between these means is real and not due to chance factors alone. The chi square is 20.840 and significant at the .01 level. This significant difference is traceable to the girls rather than the boys.

Table IV.4.3.1.

Mean, SD and χ^2 of the 5 subjects presented by sex and total groups for Memory.

Group	Subject	N	Mean	SD	χ^2	df
Boys	Science	246	61.1870	8.2859	3.906	3
	Humanities	77	62.2338	7.8854		
	Commerce	36	63.0000	7.1764		
	Technical	8	58.0000	8.5147		
	Home Science	-	-	-		
Girls	Science	74	64.2162	6.1694	32.354**	3
	Humanities	93	63.3871	7.3368		
	Commerce	6	57.1667	5.8713		
	Technical	-	-	-		
	Home Science	25	56.6400	6.4923		
Total	Science	320	61.8875	7.9506	20.840	4
	Humanities	170	62.8647	7.6119		
	Commerce	42	62.1667	7.2962		
	Technical	8	58.0000	8.5147		
	Home Science	25	56.6400	6.4923		

** $P \leq .01$

Concl. A careful study of the comparisons made on the basis of subject streams reveals the following: there are significant differences in the means of the girls

4.3 Memory:

Table IV.4.3.1.

and the total group on every one of the reasoning, language and memory variables. For the boys, the means of the subject streams are alike for combination, level of comprehension, speed of comprehension, total reading score, total English score and memory, but differ significantly for incomplete sets, verbal reasoning, analogies, vocabulary at the .01 level and for English expression at the .05 level. The difference in the means of the five subject streams of the total groups for each of the six variables, (namely combinations, level and speed of comprehension, total reading and English scores and memory) are therefore traceable to the significant difference in the means of the girls rather than the boys.

For every one of the reasoning variables the science students, both girls and boys, obtain the highest mean score. For the language variables the humanities students, both girls and boys, obtain the highest mean score with the exception of level and speed of comprehension. For memory the commerce boys and science girls obtain the highest score. The lowest mean score among the girls is obtained by the home science group without exception for every single one of the reasoning, language and memory variables. The commerce boys consistently obtain the lowest mean score for all the reasoning, and most of the language, variables. From the data it seems as though the science and humanities streams produce high mean scores among the girls and boys for every one of the reasoning, language and memory variables while the commerce - technical among the boys and commerce - home science streams among the girls display a general pattern of producing low mean scores on the whole. The high mean scores obtained by the technical boys and the commerce girls may have resulted as a consequence of the small number of observation (8 and 6 respectively) in our sample.

Section IV. 5 -- English as a first and second language.

The girls and boys in our sample are all taught through the medium of English, but not all of them learn English as the primary language. Some students prepare to offer English as the first or primary language at the school leaving examination, while others learn it as a second language. Comparisons of the students learning English as a first language with those learning it as a second language were made to investigate how they fared on the reasoning, language and memory variables. The results of the analysis are summarized in tables IV.5.1, IV. 5.2 and IV. 5.3.

5.1. Reasoning.

The means, standard deviations and chi squares of the students learning English at two levels are presented by sex and for the total group for the reasoning variables in table IV.5.1. For incomplete sets the means of the boys learning English as a first language and those learning it as a second language are 22.7004 and 19.3250 respectively. With a chi square of 18.504 these means differ significantly at the .01 level. The means of the first and second language girls are 22.1958 and 19.2182 respectively. The chi square is 6.587 and significant at the one % level. The means of the first and second language groups for incomplete sets is 22.5154 and 19.2914 respectively. With a chi square of 24.781 these means differ significantly at the .01 level.

For combinations the means of the first and second language boys are 16.4211 and 13.9250 respectively; while the chi square is 13.141 and significant at the one percent level. The means of the first and second language girls are 17.0629 and 12.6182 respectively while the chi square is 25.190 and significant at the .01 level. The means of the first and second language groups are 16.6564 and 13.5143 respectively and differ significantly with a chi square of 32.858.

The results of the verbal reasoning test are as follows: The means of the first and second language boys (73.2753 and 70.0417) differ with a chi square of 6.557 which is significant at the .05 level. The means of the first and second language girls (72.8392 and 64.3818) differ highly with a chi square of 26.817 which is significant at the .01 level. And finally, the means of the first and second language groups which are 73.1154 and 68.2629 differ also. The chi square in this case is 22.659 and significant at the .01 level.

Section IV.5.

5.1. Reasoning:

For the analogies test the means of the first and second language boys are 29.8219 and 28.7169 with a chi square of 1.375 which is not significant.

The means of the first and second language girls are 29.8182 and 26.1273 respectively. These two means produce a chi square of 10.515 which is significant at the .01 level. The means of the first and second language groups (29.8205 and 27.9029) are unlike. Since the chi square is 6.719 and significant at the .01 level.

Table IV. 5.1.

Means, SD and χ^2 of English at two levels presented by sex and total group for the Reasoning Variables.

Variable	Sex Group	English	N	Mean	SD	$\chi^2_{df=1}$
Incomplete sets.	Boys	1st language.	247	22.7004	7.4415	
		2nd ,,	120	19.3250	6.8546	18.504**
	Girls	1st ,,	143	22.1958	7.0187	
		2nd ,,	55	19.2182	7.4216	6.587**
	Total	1st ,,	390	22.5154	7.2934	
		2nd ,,	175	19.2914	7.0379	24.781**
Combinations.	Boys	1st ,,	247	16.4211	6.8341	
		2nd ,,	120	13.9250	5.8483	13.141**
	Girls	1st ,,	143	17.0629	6.5784	
		2nd ,,	55	12.6182	5.1469	25.190**
	Total	1st ,,	390	16.6564	6.7486	
		2nd ,,	175	13.5143	5.6698	32.858**

contd.....

Table IV.5.1. contd....

Variable	Sex Group	English	N	Mean	SD	χ^2
Verbal Reasoning.	Boys	1st language.	247	73.2753	9.8826	
		2nd ,,	120	70.0417	11.9982	6.557*
	Girls	1st ,,	143	72.8392	7.3709	
		2nd ,,	55	64.3818	11.2160	26.817**
	Total	1st ,,	390	73.1154	9.0454	
		2nd ,,	175	68.2629	12.0480	22.659**
Analogies	Boys	1st ,,	247	29.8219	7.6057	
		2nd ,,	120	28.7167	8.8611	1.375
	Girls	1st ,,	143	29.8182	6.1833	
		2nd ,,	55	26.1273	7.5198	10.515**
	Total	1st ,,	390	29.8205	7.1172	
		2nd ,,	175	27.9029	8.5475	6.719**

* $P \leq .05$

** $P \leq .01$

5.2. Language:

The means, standard deviations and chi squares of the students learning English at the two levels are exhibited sexwise and for the total groups in table IV. 5.2 for all six language variables.

For vocabulary, the means of the first and second language boys are 146.6802 and 139.1167 respectively. The chi square is 42.934 and significant at the .01 level. For the first and second language girls, the means are 149.0909 and 133.1636 respectively. With a chi square of the size of 172.593 these two means are significantly different. The means for the total group for vocabulary are 147.5641 and 137.2457 respectively. The chi square is 131.820 and significant at the one percent level.

For level of comprehension the results are as follows: The means of the first and second language boys are 146.5506 and 139.9583. The chi square is 29.554 and significant at the .01 level. The means of the first and second language girls are 150.7343 and 135.1636 respectively, while the chi square is 135.943 and significant at the .01 level. The means of the first and second language groups are 148.0846 and 138.4514 while the chi square is 103.356 and significant at the .01 level.

For speed of comprehension the means of the first and second language boys are 143.8381 and 139.5500 while the chi square is 21.405 and significant at the .01 level. The means of the first and second language girls are 145.5944 and 134.5455 while the chi square is 122.325 and significant at the .01 level. The means of the first and second language groups are 144.4821 and 137.9771; the chi square is 79.438 and it is significant at the .01 level.

For total reading score the means of the first and second language boys are 145.5304 and 139.5833 while the chi square is 37.093 and significant at the .01 level. On the other hand, the means of the first and second language girls are 147.5874 and 134.0546. The chi square is 180.972 and significant at the .01 level. The means of the first and second language groups are 146.2846 and 137.8457 respectively. Since the chi square is 122.288 and significant at the .01 level we conclude that these two means are different not merely due to chance factors alone.

contd....

5.2. Language:

contd...

For English expression the results are as follows: The means of the first and second language boys (147.7045 and 143.2500) differ significantly. The chi square in this case is 10.458 with $P \leq .01$. The means of the first and second language girls (149.4895 and 137.0364) also differ significantly. The chi square in this case is 110.931 though. Finally, the means of the first and second language groups are 148.3590 and 141.2971 respectively, while the chi square is 46.581 and significant at the .01 level.

For total English score the means of the first and second language boys are 146.8745 and 141.2750 respectively. The chi square is 35.411 and significant at the .01 level. The means of the first and second language girls (148.8182 and 135.8182) differ significantly. The chi square is 173.001. Similarly, the means of the first and second language groups (147.5872 and 139.5600) differ significantly. The chi square in this case is 118.331 though.

Table IV. 5.2.

Means, SD and χ^2 of English at two levels presented by sex and total groups for the Language Variables.

Variable	Group	English	N	Mean	SD	χ^2 df=1
Vocabulary	Boys	1st lan- guage	247	146.6802	11.8088	
		2nd ,,	120	139.1167	9.5087	42.934
	Girls	1st ,,	143	149.0909	10.5862	
		2nd ,,	55	133.1636	6.1430	172.593**
	Total	1st ,,	390	147.5641	11.4350	
		2nd ,,	175	137.2457	9.0927	131.820**

contd...

Table IV.5.2. contd.....

Variable	Group	English	N	Mean	SD	χ^2 df=1
Level of Comprehension.	Boys	1st language..	247	146.5506	10.8368	
		2nd ,,	120	139.9583	10.9266	29.554**
	Girls	1st ,,	143	150.7343	9.9001	
		2nd ,,	55	135.1636	7.7711	135.943**
	Total	1st ,,	390	148.0846	10.6948	
		2nd ,,	175	138.4514	10.2860	103.356**
Speed of Comprehension.	Boys	1st ,,	247	143.8381	9.1398	
		2nd ,,	120	139.5500	7.9055	21.405**
	Girls	1st ,,	143	145.5944	9.1660	
		2nd ,,	55	134.5455	4.7515	122.325**
	Total	1st ,,	390	144.4821	9.1886	
		2nd ,,	175	137.9771	7.4397	79.438**
Total Reading Score.	Boys	1st ,,	247	145.5304	9.8597	
		2nd ,,	120	139.5833	8.1972	37.093**
	Girls	1st ,,	143	147.5874	9.2050	
		2nd ,,	55	134.0546	4.8030	180.972**
	Total	1st ,,	390	146.2846	9.6756	
		2nd ,,	175	137.8457	7.7404	122.288**

** P \leq .01

contd...

Table IV.5.2. contd.....

Variable.	Group	English		N	Mean	SD	χ^2	$f=1$
English Expression.	Boys	1st language.		247	147.7045	9.9064		
		2nd	,,	120	143.2500	13.4153	10.458**	
	Girls	1st	,,	143	149.4895	8.6120		
		2nd	,,	55	137.0364	6.9544	110.931**	
	Total	1st	,,	390	148.3590	9.4015		
		2nd	,,	175	141.2971	12.1215	46.581**	
Total English Score.	Boys	1st	,,	247	146.8745	9.4113		
		2nd	,,	120	141.2750	7.9498	35.411**	
	Girls	1st	,,	143	148.8182	8.4004		
		2nd	,,	55	135.8182	5.1561	173.001**	
	Total	1st	,,	390	147.5372	9.1040		
		2nd	,,	175	139.5600	7.6229	118.331**	

** $P \leq .01$

5.3. Memory:

The means, standard deviation and chi squares of the first and second language girls, boys and total groups are exhibited in table IV.5.3. The means of the first and second language boys are 62.2672 and 59.9367 with a chi square of 5.501 which is significant at the .05 level. The means of the first and second language girls are 64.1189 and 58.8545 with a chi square of 24.838 which is significant at the .01 level. And finally, the means of the first and second language groups are 62.9462 and 59.6171 while the chi square is 19.683 ($P \leq .01$).

Table IV. 5.3.

Means, SD and χ^2 of English at two levels presented by sex and total groups for Memory.

Group	English	N	Mean	SD	χ^2 df=1
Boys	1st language	247	62.2672	7.3071	
	2nd ,,	120	59.9367	9.4604	5.501*
Girls	1st ,,	143	64.1189	6.9760	
	2nd ,,	55	58.8545	6.5211	24.888**
Total	1st ,,	390	62.9462	7.2427	
	2nd ,,	175	59.6171	8.6604	19.683**

* $P \leq .05$

** $P \leq .01$

Concl: A careful study of the comparisons of the first and second language classes discloses the following: The means of the first and second language boys, girls and total groups differ significantly for every one of the reasoning, language and memory variables. The mean of the first language is higher than that of the second language without exception for every variable, when comparisons are made among boys, girls and the total groups. This indicates that those students learning English as a first language are superior to those

learning it as a second language on every one of the reasoning, language and memory variables.

As to why the second language students have fared poorly on the reasoning tests, it may be recalled that the majority of students taking English as a first language are from the ISC section.

It has further been noticed that the means of the first language girls are higher and those of the second language girls lower than their male counterparts for every one of the language and memory variables. This indicates that the first language girls are somewhat superior to the first language boys, but the second language girls are inferior to the second language boys. On the reasoning variables, however, the girls and boys are very much alike.

Section IV. 6. Teacher qualification.

The results of the comparisons of students who were taught English by the teachers with different qualifications are exhibited in tables IV.6.1.1, IV. 6.1.2; IV.6.1.3; IV.6.1.4 for the reasoning variables; in tables IV.6.2.1, IV.6.2.2, IV.6.2.3, IV.6.2.4, IV.6.2.5 and IV.6.2.6 for the language variables and IV .6.3 for memory. The means of girls and boys who were taught by teachers who had the following qualifications were compared for each of the eleven variables undergraduate qualifications with no teacher training; those with postgraduate qualifications but no teacher training; those who are graduates with teacher training and those who have postgraduate qualifications with teacher training.

From the tables it is noted that the chi squares for the boys, girls and total groups are significant for all the variables except those of the girls for incomplete sets and memory. It is observed that the means of the boys taught by teachers with undergraduate qualification and no teacher training are significantly lower than the means of those taught by teachers of the other three groups for every one of the reasoning, language and memory variables. These boys belong to the Higher Secondary group with English as the second language. Possibly therefore these low means have nothing to do with the teacher who teaches English, but are a consequence of other factors.

Furthermore, it is evident that the means of those students taught English by postgraduate trained teachers are lower than the means of those taught by postgraduate untrained and graduate trained teacher for all eleven variables. Peculiarly enough, all these teachers are employed in schools where the students produce poor results both in our tests and, as a rule, in the school leaving examination. In a number of these schools there is a high rate of student mobility. These schools are known to admit a number of new students, at the secondary stage, some of whom are genuine cases of the parents being transferred, while others are immigres with promotion to these schools from other schools where the promotion policies are stricter. It seems therefore that the low means produced by these students cannot really be traceable to the high qualifications of the teachers, but is traceable to the students themselves. It is also probable that the weaker student is handed over to these well qualified teachers to teach.

Table IV.6.1.1.

Means, SD and χ^2 of the students classified on the basis of the qualification of teachers teaching English to class 10, presented by sex and total groups for Incomplete Sets.

Group	Teacher Qualification.	N	Mean	SD	χ^2	df.
Boys	Undergrad-untr.	27	13.4444	6.9779		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	22.4586	7.0036		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	22.4242	7.4173	40.507**	3
	Postgrad-tr.	75	21.5467	6.4731		
Girls	Undergrad-untr.	-	-	-		
	Grad-untr.	-	-	-		
	Postgrad-untr.	3	24.3333	8.8066		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	21.8621	7.4138	2.016	2
	Postgrad-tr.	79	20.5316	6.8507		
Total	Undergrad-untr.	27	13.4444	6.9779		
	Grad-untr.	-	-	-		
	Postgrad-untr.	136	22.5000	7.0586		
	Undergrad-tr.	-	-	-		
	Grad-tr.	248	22.1613	7.4210	41.442**	3
	Postgrad-tr.	154	21.0260	6.6888		

** P \leq .01

Table IV.6.1.2.

Means, SD and χ^2 of the students classified on the basis of the qualifications of teachers teaching English to class 10, presented by sex and total groups for Combinations.

Group	Teacher Qualification.	N	Mean	SD	χ^2	df
Boys	Undergrad-untr.	27	9.8148	4.6828		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	16.0752	5.9340		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	16.1591	7.1667	41.786**	3
	Postgrad-tr.	75	15.8800	6.4373		
Girls	Undergrad-untr	-	-	-		
	Grad-untr.	-	-	-		
	Postgrad-untr.	3	15.3333	4.1096		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	17.2069	6.6287	14.010**	2
	Postgrad-tr.	79	13.8228	5.8931		
Total	Undergrad-untr.	27	9.8148	4.6828		
	Grad-untr.	-	-	-		
	Postgrad-untr.	136	16.0588	5.9009		
	Undergrad-tr.	-	-	-		
	Grad-tr.	248	16.6492	6.9400	49.443**	3
	Postgrad-tr.	154	14.8247	6.2493		

** $P \leq .01$

Table IV. 6.1.3.

Means, SD and χ^2 of the students classified on the basis of the qualifications of teachers teaching English to class 10, presented by sex and total groups for Verbal Reasoning.

Group	Teacher qualification.	N	Mean	SD	χ^2	df.
Boys	Undergrad-untr.	27	57.5185	13.7850		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	75.0301	9.2333		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	73.1818	9.9695	45.104**	3
	Postgrad-tr.	75	70.8267	8.4670		
Girls	Undergrad-untr.	-	-	-		
	Grad-untr.	-	-	-		
	Postgrad-untr.	3	66.3333	4.9216		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	72.2328	7.8393	11.143**	2
	Postgrad-tr.	79	68.0886	10.9477		
Total	Undergrad-untr.	27	57.5185	13.7850		
	Grad-untr.	-	-	-		
	Postgrad-untr.	136	74.8382	9.2976		
	Undergrad-tr.	-	-	-		
	Grad-tr.	248	72.7379	9.0483	54.477**	3
	Postgrad-tr.	154	69.4221	9.9131		

** $P \leq .01$

Table IV. 6.1.4.

Means, SD and χ^2 of the students classified on the basis of the qualifications of teachers teaching English to class 10, presented by sex and total groups for Analogies.

Group	Teacher Qualification.	N	Mean	SD	χ^2	df.
Boys	Undergrad-untr.	27	17.3704	10.2673		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	31.2556	6.8755		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	30.3712	6.9798	47.081**	3
	Postgrad-tr	75	29.0267	7.0672		
Girls	Undergrad-untr.	-	-	-		
	Grad-untr.	-	-	-		
	Postgrad-untr.	3	33.3333	3.2998		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	29.8448	5.4117	11.446**	2
	Postgrad-tr.	79	27.0759	8.1641		
Total	Undergrad-untr.	27	17.3704	10.2673		
	Grad-untr.	-	-	-		
	Postgrad-untr.	136	31.3015	6.8237		
	Undergrad-tr.	-	-	-		
	Grad-tr.	248	30.1250	6.3006	54.809**	3
	Postgrad-tr.	154	28.0260	7.7115		

** $P \leq .01$

Table IV. 6.2.1.

Means, SD and χ^2 of the students classified on the basis of the qualifications of teachers teaching English to class 10 presented by sex and total groups for Vocabulary.

Group	Teacher Qualification.	N	Mean	SD	χ^2	df.
Boys	Undergrad-untr	27	134.6667	6.4290		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	145.5639	11.0531		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	145.7197	12.7957	58.431**	3
	Postgrad-tr.	75	142.5733	10.2881		
Girls	Undergrad-untr.	-	-	-		
	Grad-untr.	-	-	-		
	Postgrad-untr.	3	142.0000	7.8740		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	148.6121	11.2371	37.082**	2
	Postgrad-tr.	79	138.9747	10.6486		
Total	Undergrad-untr	27	134.6667	6.4290		
	Grad-untr.	-	-	-		
	Postgrad-untr.	136	145.4853	11.0054		
	Undergrad-tr.	-	-	-		
	Grad-tr.	248	147.0726	12.1776	86.846**	3
	Postgrad-tr.	154	140.7273	10.6279		

** P .01

Table IV. 6.2.2.

Means, SD and χ^2 of the students classified on the basis of the qualifications of teachers teaching English to class 10, presented by sex and total groups for level of comprehension.

Group	Teacher Qualification.	N	Mean	SD	χ^2	df.
Boys	Undergrad-untr.	27	136.9259	6.1879		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	145.6767	10.9232		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	146.0603	12.3055	42.789**	3
	Postgrad-tr.	75	141.9333	9.9470		
Girls	Undergrad-untr.	-	-	-		
	Grad-untr.	-	-	-		
	Postgrad-untr.	3	147.3333	3.6819		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	150.0603	10.3118	31.065**	2
	Postgrad-tr.	79	141.0127	11.6613		
Total	Undergrad-untr.	27	136.9259	6.1879		
	Grad-untr.	-	-	-		
	Postgrad-untr.	135	145.7132	10.8186		
	Undergrad-tr.	-	-	-		
	Grad-tr.	248	147.9153	11.5921	75.221**	3
	Postgrad-tr.	154	141.4610	10.8700		

** $P \leq .01$

Table IV. 6.2.3.

Means, SD and χ^2 of the students classified on the basis of the qualifications of teachers teaching English to class 10, presented by sex and total groups for speed of comprehension.

Group	Teacher Qualification.	N	Mean	SD	χ^2	df.
Boys	Undergrad-untr.	27	134.7407	4.8883		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	143.9850	3.3917		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	143.5152	9.5350	69.940	3
	Postgrad-tr.	75	140.5600	8.3820		
Girls	Undergrad-untr.	-	-	-		
	Grad-untr.	-	-	-		
	Post-grad-untr.	3	138.3333	6.5490		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	145.3103	9.7975	29.431	2
	Postgrad-tr.	79	133.5949	7.6877		
Total	Undergrad-untr.	27	134.7407	4.8883		
	Grad-untr.	-	-	-		
	Postgrad-untr.	136	143.8603	8.3966		
	Undergrad-tr.	-	-	-		
	Grad-tr.	248	144.3548	9.7001	92.772	3
	Postgrad-tr.	154	139.5520	8.0936		

** P ≤ .01

Table IV. 6.2.4.

Means, SD and \bar{X} of the students classified on the basis of the qualifications of teachers teaching English to class 10, presented by sex and total groups for Total Reading.

Group	Teacher Qualification.	N	Mean	SD	\bar{X}	df.
Boys	Undergrad-untr.	27	134.9630	4.7570		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	145.0376	8.9076		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	144.8561	10.6181	84.115**	3
	Postgrad-tr.	75	141.8800	9.0671		
Girls	Undergrad-untr.	-	-	-		
	Grad-untr.	-	-	-		
	Postgrad-untr.	3	141.3333	3.6819		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	147.1724	9.9337	37.484**	2
	Postgrad-tr.	79	139.0127	8.7330		
Total	Undergrad-untr.	27	134.9630	4.7570		
	Grad-untr.	-	-	-		
	Postgrad-untr.	136	144.9559	8.8425		
	Undergrad-untr.	-	-	-		
	Grad-tr.	248	145.9395	10.3682	113.767**	3
	Postgrad-tr.	154	140.4091	9.0120		

** $p \leq .01$

Table IV. 6.2.5.

Means, SD and X^2 of the students classified on the basis of the qualifications of teachers teaching English to class 10, presented by sex and total group for English Expression.

Group	Teacher Qualification.	N	Mean	SD	X^2	df.
Boys	Undergrad-untr.	27	136.4074	7.2687		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	148.9774	13.2089		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	147.0530	9.3351	57.615**	3
	Postgrad-tr.	75	143.5333	8.6770		
Girls	Undergrad-untr.	-	-	-		
	Grad-untr.	-	-	-		
	Postgrad-untr.	3	145.6667	2.3568		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	148.9397	9.4479	28.052**	2
	Postgrad-tr.	79	141.7722	9.1679		
Total	Undergrad-untr.	27	136.4074	7.2687		
	Grad-untr.	-	-	-		
	Postgrad-untr.	136	148.9044	13.0761		
	Undergrad-tr.	-	-	-		
	Grad-tr.	248	147.9355	9.7326	82.559**	2
	Postgrad-tr.	154	142.6299	8.9754		

** $P \leq .01$

Table IV. 6.2.6.

Means, SD and χ^2 of the students classified on the basis of the qualifications of teachers teaching English to class 10, presented by sex and total group for Total English Score.

Group	Teacher Qualification.	N	Mean	SD	χ^2	df.
Boys	Undergrad-untr.	27	136.0000	5.4840		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	146.8872	8.6803		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	146.2197	9.8621	80.032**	3
	Postgrad-tr.	75	142.9600	8.3001		
Girls	Undergrad-untr.	-	-	-		
	Grad-untr.	-	-	-		
	Postgrad-untr.	3	143.6667	1.8854		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	148.3362	9.1988	36.859**	2
	Postgrad-tr.	79	140.6709	8.4729		
Total	Undergrad-untr.	27	136.0000	5.4840		
	Grad-untr.	-	-	-		
	Postgrad-untr.	136	146.8162	8.6016		
	Undergrad-tr.	-	-	-		
	Grad-tr.	248	147.2097	9.6158	109.749**	3
	Postgrad-tr.	154	141.7857	8.4669		

** $p \leq .01$

Table IV. 6.3.1.

Means, SD and χ^2 of the students classified on the basis of the qualifications of teachers teaching English to class 10, presented by sex and total groups for Memory.

Group	Teacher Qualification.	N	Mean	SD	χ^2	d.f.
Boys	Undergrad-untr.	27	63.5926	3.9743		
	Grad-untr.	-	-	-		
	Postgrad-untr.	133	61.4211	7.8373		
	Undergrad-tr.	-	-	-		
	Grad-tr.	132	62.1439	8.6499	6.289*	3
	Postgrad-tr.	75	59.8267	7.0718		
Girls	Undergrad-untr.	-	-	-		
	Grad-untr.	-	-	-		
	Postgrad-untr.	3	65.3333	4.7140		
	Undergrad-tr.	-	-	-		
	Grad-tr.	116	63.3879	7.1424	4.207	3
	Postgrad-tr.	79	61.4810	7.3102		
Total	Undergrad-untr.	27	63.5926	3.9743		
	Grad-untr.	-	-	-		
	Postgrad-untr.	136	61.5074	7.8037		
	Undergrad-tr.	-	-	-		
	Grad-tr.	248	62.7258	8.0044	8.295*	3
	Postgrad-tr.	154	60.6753	7.2424		

* $P \leq .05$

** $P \leq .01$

Section IV.7 -- School Type.

The schools in our sample can be classified into three types on the basis of the fees charged by them. Those schools charging the highest fees attract the children of rich businessmen, directors of private firms, successful professional people and high officials in the government and armed forces who can well afford not only to pay the high fees but also to spend money on the many frills that go with having a child in such a school. The schools of the second type often attract the children of the educated professional people who find it difficult to keep up any false standard but are still anxious to provide the best for their child and are therefore prepared to make sacrifices in order to educate their offspring. The third type of schools draws students from a class of tradesmen who have acquired money and some social position in the last decade and the half impoverished middle class both of whom desire to provide their children with as sound an education as they can manage.

Comparisons of the students of these three types of schools were undertaken in order to determine whether any significant difference exists between them. The results of the analyses are summarized in Tables IV. 7.1.1, IV.7.1.2., IV.7.1.3., and IV.7.1.4 for the reasoning variables; tables IV.7.2.1, IV.7.2.2, IV.7.2.3 IV.7.2.4, IV.7.2.5 and IV.7.2.6 for the language variables and in table IV.7.3 for memory.

7.1. Reasoning:

Table IV.7.1.1 exhibits the means, standard deviations and chi squares of the boys, girls and total group for incomplete sets. The means of the boys in type I, II and III schools are 24.2260, 20.9363 and 17.2188 respectively. The chi square being 43.462 and significant at the one percent level the three means differ due to factors other than chance alone. The means of the girls in the three types of schools are 22.7115 for type I; 21.5588 for type II and 20.3077 for type III. Since the chi square is 3.513 and not significant we may conclude that the means differ merely due to chance. The means of the total group for type I, II and III schools are as follows: type I - 23.8283; type II - 21.1244 and type III - 18.9155. The chi square is 39.316 and significant at the .01 level. This significant difference in the means of the total group is traceable to the boys rather than to the girls.

Table IV. 7.1.1.

Means, SD and X^2 of school types presented
by sex and total groups for Incomplete Sets.

Group	School type.	N	Mean	SD	$\chi^2(df=2)$
Boys	I	146	24.2260	6.7304	
	II	157	20.9363	6.8716	
	III	64	17.2188	7.8112	43.462
Girls	I	52	22.7115	7.4373	
	II	68	21.5588	7.1353	
	III	78	20.3077	7.0298	3.513
Total	I	198	23.8283	6.9552	
	II	225	21.1244	6.9738	
	III	142	18.9155	7.5500	39.316**

**p \leq .01

7.1.2. The means, standard deviations and chi squares of the girls, boys and total group for combinations are displayed in Table IV.7.1.2. The means of the boys from type I, II and III schools are 17.0068, 16.1147 and 11.1563 respectively. The chi square is 45.258 and significant at the .01 level. The means of the girls are as follows: 17.2885 for type I, 16.6618 for type II and 14.1282 for type III. The chi square is 9.984 and significant at the .01 level. The means of the total group are 17.0808 for type I, 16.2800 for type II and 12.7887 for type III. With a chi square of 43.106 these means differ significantly at the one percent level.

Table IV. 7.1.2.

Means, SD and χ^2 of school types presented by sex and total group for Combinations.

Group	School type	N	Mean	SD	χ^2 df = 2
Boys	I	146	17.0068	6.9956	
	II	157	16.1147	5.8145	
	III	64	11.1563	5.7234	45.258**
Girls	I	52	17.2885	6.5672	
	II	68	16.6618	6.7598	
	III	73	14.1282	5.8799	9.984**
Total	I	198	17.0808	6.8868	
	II	225	16.2800	6.1208	
	III	142	12.7887	5.9951	43.106**

** $P \leq .01$

7.1.3. Table IV.7.1.3 shows the means, standard deviations and chi squares of the girls, boys and total group from each of the three school types for verbal reasoning. The means of the boys are 75.5411 for type I, 73.3376 for type II and 61.8906 for type III. The chi square being 65.994 and significant at the .01 level, these means differ due to factors other than chance alone. The means of the girls (I=75.2308, II=71.4706, III=66.4744) also differ significantly, the chi square being 33.787 and $P \leq .01$. The means of the total group are 75.4596 for type I, 72.7733 for II and 64.4085 for III. The chi square is 97.123 and significant at the .01 level.

Table IV. 7.1.3.

Means, SD and χ^2 of school types presented by sex and total group for verbal reasoning.

Group	School type	N	Mean	SD	χ^2 df=2
Boys	I	146	75.5411	8.5968	
	II	157	73.3376	9.2092	
	III	64	61.8906	12.1849	65.994**
Girls	I	52	75.2308	6.8490	
	II	68	71.4706	7.9121	
	III	78	66.4744	10.3413	33.787**
Total	I	198	75.4596	8.1752	
	II	225	72.7733	8.8788	
	III	142	64.4085	11.4395	97.123**

** $P \leq .01$

7.1.4. The results for analogies are summarized in Table IV. 7.1.4. The means for the boys are 31.1712; 30.7707 and 22.3438 for school types I, II and III respectively. The chi square is 41.315 and significant at the .01 level. The means of the girls, on the other hand, are 30.1154; 29.6471 and 27.1667 for types I, II and III. The chi square is 7.824 and significant at the .05 level. The means of the total group are 30.8939; 30.4311 and 24.9930 for types I, II and III. The chi square is 47.763 and significant at the .01 level. This difference in the means is traceable more to the boys than to the girls. Furthermore, the real difference in the means lies between those of types I and II on the one hand and type III on the other, since the means of I and II are almost identical.

Table IV. 7.1.4.

Means, SD and χ^2 of school types presented by sed and total groups for Analogies.

Group	School type	N	Mean	SD	χ^2 df=2
Boys	I	146	31.1712	6.3098	41.315**
	II	157	30.7707	6.7690	
	III	64	22.3438	10.3565	
Girls	I	52	30.1154	5.3445	7.824*
	II	68	29.6471	6.8229	
	III	78	27.1667	7.2685	
Total	I	198	30.8939	6.0889	47.763**
	II	225	30.4311	6.8050	
	III	142	24.9930	9.1170	

* $P \leq .05$

** $P \leq .01$

7.2 Language:

The results of the comparisons made for the six language variables are discussed below :

7.2.1. The means, standard deviations and chi squares of the boys, girls and total group for vocabulary are presented in Table IV.7.2.1. The means of the boys are 149.6233 for type I; 143.0127 for type II and 134.7813 for III. The chi square is 142.961 and significant at the .01 level. The means of the girls of type I, II & III schools are 155.0962; 145.5735 and 136.9231 respectively. The chi square is 103.921 and significant at the .01 level. The means of the total groups are 151.0606 for type I, 143.7867 for II and 135.9578 for III. The chi square is 211.117 and significant at the .01 level.

Table IV. 7.2.1.

Means, SD and χ^2 of school types presented by sex and total group for Vocabulary.

Group	School type.	N	Mean	SD	χ^2 if=2
Boys	I	146	149.6233	11.6573	
	II	157	143.0127	10.5287	
	III	64	134.7813	6.4746	142.961**
Girls	I	52	155.0962	10.8916	
	II	68	145.5735	9.3845	
	III	78	136.9231	8.4970	103.921**
Total	I	198	151.0606	11.7114	
	II	225	143.7867	10.2640	
	III	142	135.9578	7.7258	211.117**

**P \leq .01

7.2.2. Table IV. 7.2.2. summarizes the results of the comparisons made sexwise and for the total groups for level of comprehension. The means of the boys are 149.2260 of type I schools, 143.8089 for type II, and 134.8125 for type III. The chi square is 135.637 and significant at .01 level. The means of the girls of type I, II and III schools are 155.7885; 148.2059 and 138.5897 respectively. The chi square is 113.769 and significant at the .01 level. The means of the boys and girls put together are 150.9495 for type I schools; 145.1373 for type II and 136.8873 for III. The chi square is 182.525 and significant at the one percent level.

Table IV. 7.2.2.

Means, SD and χ^2 of school type presented by sex and total group for Level of Comprehension.

Group	School type	N	Mean	SD	χ^2 df=2.
Boys	I	146	149.2260	10.8114	
	II	157	143.8089	10.4924	
	III	64	134.8125	7.0220	135.637**
Girls	I	52	155.7885	8.9472	
	II	68	148.2059	9.7023	
	III	78	138.5897	9.3651	113.769**
Total	I	198	150.9495	10.7496	
	II	225	145.1378	10.4568	
	III	142	136.8873	8.5984	182.525**

**P \leq .01

7.2.3. The means, standard deviations and chi squares of the three types of schools are presented sexwise and for the total group for speed of comprehension in table IV.7.2.3. The means of the boys from schools I, II and III are 146.1438; 141.8662 and 135.3750 respectively. With a chi square of 119.232 these means differ significantly. The means of the girls are 150.7115 for type I schools, 142.6765 for II and 136.9359 for III. The chi square is 93.318 with $P \leq .01$. The means of the total group are as follows: type I-147.3434 type II-142.1111 and type III-136.2324. The chi square is 178.158 and significant at the .01 level.

Table IV. 7.2.3.

Mean, SD and χ^2 of school type presented by sex and total group for Speed of Comprehension.

Group	School type	N	Mean	SD	$\chi^2_{df=2}$
Boys	I	146	146.1438	8.7538	119.232**
	II	157	141.8662	8.4658	
	III	64	135.3750	5.4900	
Girls	I	52	150.7115	8.5064	93.318**
	II	68	142.6765	8.0045	
	III	78	136.9359	7.2170	
Total	I	198	147.3434	8.9191	178.158**
	II	225	142.1111	8.3374	
	III	142	136.2324	6.5421	

**P \leq .01

7.2.4. Table IV. 7.2.4 reveals the results of comparisons of the three types of schools made sexwise for the total group for total reading score. The means of the boys from type I, II and III schools are 148.1575, 142.7070 and 135.3125 respectively. The chi square is 169.014 and significant at the .01 level. The means of the girls from the three types of schools are 153.0769 for I, 144.3824 for II and 137.1795 for III. The chi square is 119.166 and significant at the .01 level. The means of the total group are 149.4495 for type I schools, 143.2133 for type II and 136.3380 for type III. The chi square is 236.278 and significant at the .01 level.

Table IV. 7.2.4.

Mean, SD and χ^2 of school type presented
by sex and total group for total Reading Score.

Group	School type	N	Mean	SD	χ^2 df=2
Boys	I	146	148.1575	9.4679	
	II	157	142.7070	8.9707	
	III	64	135.3125	5.0864	169.014**
Girls	I	52	153.0769	8.9676	
	II	68	144.3824	8.2159	
	III	73	137.1795	7.1355	119.166**
Total	I	198	149.4495	9.5867	
	II	225	143.2133	8.7833	
	III	142	136.3380	6.3632	236.278**

** $P \leq .01$

7.2.5. The results of the comparisons made sex-wise and for the total group are summarized in Table IV. 7.2.5 for English expression. The means of the boys from the three types of schools are I - 151.2603, II - 144.8917 and III - 138.1406. The chi square is 128.081 and significant at the .01 level. The means of the girls are 153.4615 for type I, 145.6324 for type II and 141.4231 for type III. The chi square is 166.874 and significant at the .01 level.

Table IV. 7.2.5.

Mean, SD and χ^2 of school type presented by sex and total groups for English Expression.

Group	School type	N	Mean	SD	$\chi^2_{df=2}$
Boys	I	146	151.2603	8.9872	
	II	157	144.8917	12.4182	
	III	64	138.1406	7.1498	128.081**
Girls	I	52	153.4615	7.5331	
	II	68	145.6324	9.3099	
	III	78	141.4231	8.8019	70.320**
Total	I	198	151.8384	8.6233	
	II	225	145.1156	11.5721	
	III	142	139.9437	8.2623	166.874**

** $P \leq .01$

7.2.6. The results of the comparisons for total English scores are displayed in table IV.7.2.6.

The means of the students from the three types of schools with girls and boys put together are 149.9795 for type I, 143.7325 for type II and 137.0000 for type III. The chi square is 163.688 and significant at the .01 level. The means of the girls are 153.5385, 145.2941 and 139.5769 for school types I, II and III respectively. These means differ significantly with a chi square of 102.505. The means of the total groups are 150.9141; 144.2044 and 138.4155 for school types I, II and III respectively. The chi square is 220.512 and significant at the .01 level.

Table IV. 7.2.6.

Mean, SD and χ^2 of school type presented by sex and total groups for Total English Score.

Group	School type	N	Mean	SD	χ^2 df = 2
Boys	I	146	149.9795	8.7245	
	II	157	143.7325	8.3104	
	III	64	137.0000	5.7064	163.688**
Girls	I	52	153.5385	7.8678	
	II	68	145.2941	8.2427	
	III	78	139.5769	7.4637	102.505**
Total	I	198	150.9141	8.6508	
	II	225	144.2044	8.3210	220.512**
	III	142	138.4155	6.8498	

** P \leq .01

7.3. Memory:

The results of the comparisons of students from each of the three types of schools are summarized for girls, boys and total groups in table IV.7.3 for memory. The means of the boys are 62.1096, 61.3248 and 60.6250 for school types I, II and III respectively. The chi square is 1.540 and not significant, indicating that the three means differ due to chance. The means of the girls are 65.6731 for school type I; 62.8382 for type II and 60.4872 for type III. With a chi of 19.266 these three means differ significantly. Finally, the means of the three total groups are as follows: 63.0455 for school type I; 61.7822 for type II and 60.5493 for type III. With a chi square of 8.738 at 2 degrees of freedom, these means just significantly differ at the .05 level.

Table IV. 7.3.1.

Mean, SD and χ^2 of school type presented by sex and total groups for Memory.

Group	School type	N	Mean	SD	χ^2 df=2
Boys	I	146	62.1096	7.0730	1.540
	II	157	61.3248	8.2170	
	III	64	60.6250	8.9475	
Girls	I	52	65.6731	6.5390	19.266**
	II	68	62.8382	7.5002	
	III	78	60.4872	6.7058	
Total	I	198	63.0455	7.1154	8.738*
	II	225	61.7822	8.0372	
	III	142	60.5493	8.3249	

* $P \leq .05$

** $P \leq .01$

contd.....

7.3. Memory. contd....

Concl.

A further look at our data reveals that the chi squares for the total groups and the boys are significant at the .01 level for each and every one of the reasoning and language variables. The chi squares for the girls are significant at the .01 level for all the language, memory and reasoning variables with the exception of incomplete sets. Furthermore, the means of type II girls are larger than those of type III boys for each of the reasoning and language variables. The means of the type I girls are larger than those of type I boys for all the six language variables; but the type I boys produce higher means than type I girls for incomplete sets and analogies. The means of the three types of schools when placed in descending order of magnitude consistently produce the same pattern whether we consider the girls boys or total groups, for every one of the reasoning, language and memory variables; type I schools produce the highest mean score followed by type II with type III having the lowest mean score. When comparing the difference between the means of the three school types it is noted that the difference between types I and II is smaller than that between either I or II and III. School types I and II therefore seem to be more alike than either of them are to school type III.

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CHAPTER V

INTER CORRELATIONS

One of the objectives of the project was to investigate the relations among and between the reasoning, language, memory and academic achievement variables. Hence, inter-correlations were computed (1) among each of the four types of variables and (2) between each type and every other. All the correlations are displayed in matrices V.A and V.B.

Intercorrelations among each of the 3 types of variables are discussed in three sections as follows:

<u>Section.</u>	<u>Intercorrelation among variables.</u>
V. 1.1 ..	Reasoning
V. 1.2 ..	Language
V. 1.3 ..	School achievement.

Intercorrelations between the four types of variables (reasoning, language, memory and school achievement) are dealt with in 6 (six) sections as follows:

<u>Section.</u>	<u>Intercorrelations between groups of variables.</u>
V. 2.1 ..	Reasoning and Language.
V. 2.2 ..	Reasoning and Memory.
V. 2.3 ..	Reasoning and School achievement.
V. 2.4 ..	Language and memory.
V. 2.5 ..	Language and school achievement.
V. 2.6 ..	Memory and school achievement.

contd....

Circle 11

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		12	13	14	15	16
Language Arts	..	12	.4091	.5014	.5741	.2971
Oral Language	..	13	.3349	.4014	.2964	.3521
Reading Language	..	14	.4039	.4541	.5465	.5091
Analogies	..	15	.4078	.4474	.5361	.238
Vocabulary	..	16	.2685	.4440	.529	.3294
Level of Comprehension	..	17	.4378	.4448	.5733	.3979
Speed of Comprehension	..	18	.3819	.4597	.5573	.3519
Total reading score	..	19	.4013	.4759	.5731	.3655
English Expression	..	20	.4210	.4335	.5327	.3243
Total English Score	..	21	.4309	.4796	.5816	.3632
Memory	..	22	.3620	.3649	.3350	.3662
School marks in English	..	23	.3442	.4257	.4361	.3250
School marks in Indian Language	..	24	.1996	.1739	.3161	.1626
School marks in Core Subjects	..	25	.4830	.4623	.5227	.4776
School marks in Elective Subjects	..	26	.3847	.3950	.4451	.2812
Total School achievement	..	27	.4249	.4656	.3650	.4048

↑ G I N L S

V. I. CORRELATION OF TWO GROUPS OF VARIABLES OF REASONING, LANGUAGE AND SCHOOL ACHIEVEMENTS.

V.1.1. Reasoning:

It may be noted from table V.1.1 that the intercorrelations among the reasoning variables for girls and boys differ due to chance factors. All the twelve intercorrelations are of moderate size and significant.

Table - V. 1.1.

List of intercorrelations among the reasoning variables and the corresponding Zs for girls and boys.

Variables.	Correlations		Z	
	Girls	Boys	Girls	Boys
Incomplete sets & Combination	.5548	.4691	.6253	.5089
Incomplete sets & Verbal reasoning.	.4839	.5214	.5281	.5783
Incomplete sets & analogies.	.6078	.5741	.7054	.6537
Combinations & Verbal reasoning.	.4542	.4684	.4900	.5080
Combinations & analogies.	.4474	.3954	.4815	.4182
Verbal reasoning & analogies.	.5361	.5465	.5987	.6134

V.1.2. Language:

The intercorrelations, the corresponding Z's and the F's for the intercorrelations among the language variables are presented sexwise in table V.1.2.

All the 15 pairs of intercorrelations among the language variables are high. Five of them differ at the .05 level for girls and boys and one differs at the .01 level for the two sexes. The correlations between vocabulary and level of comprehension; vocabulary and English expression; level of comprehension and total reading score; level of comprehension and English expression; total reading score and English Expression differ significantly at the .05 level for the two sexes. The correlations between English expression and total English score for the girls and boys differ significantly at the .01 level. In the case of every one of the intercorrelations among the language variables the correlations for the girls are higher than those for the boys, but only in the above mentioned six cases are they significantly higher.

Language

Table V. 1.2.

The Intercorrelations and the Z test among the language variables and the corresponding Zs for girls and boys

Variables		Correlations		Z		Sig nif. F
		Girls	Boys	Girls	Boys	
Vocabulary	-Level of ..	.7874	.6989	1.0645	0.8652	*
	Compreh.					
Vocabulary	-Speed of ..	.7945	.7607	1.0836	0.9978	
	Compreh					
Vocabulary	-Total reading	.9576	.9527	1.9165	1.8601	
Vocabulary	-English ..	.7997	.7092	1.0978	0.8855	*
	expression.					
Vocabulary	-Total English	.9203	.9088	1.5909	1.5209	
Level of compreh	-Speed of ..	.8367	.8111	1.2101	1.1301	
	Compreh.					
Level of compreh	-Total reading	.8548	.7943	1.2736	1.0830	*
Level of compreh	-English ..	.7187	.6103	0.9050	0.7095	*
	expression.					
Level of comoreh	-Total English	.8236	.7653	1.1680	1.0088	
Speed of comreh	-Total reading	.9335	.9198	1.6847	1.5877	
Speed of comreh	-English					
	expression..	.7697	.6889	1.0197	0.8459	
Speed of comreh	-Total English	.8925	.8749	1.4340	1.3536	
Total reading	-English					
	expression..	.8290	.7463	1.1848	0.9647	*
Total reading	- Total English.	.9580	.9526	1.9213	1.8593	
English expression	-Total					
	English.	.9536	.8567	1.8698	1.2807	**

*P ≤ .01

**P ≤ .05

V.1.3. School Achievement:

Altogether 10 pairs of intercorrelations were computed among the school achievement variables. These are displayed in table V.1.3. In every single case the correlations for the two sexes differ due to chance alone. The intercorrelations between English and Indian language; English and core subjects; Indian language and core subjects; contd..

Indian language and elective subjects are moderate. This indicates that if a student obtains high marks in one language he does not always obtain high marks in other language or in his core or elective subjects.

The correlations between English and elective subjects; English and total school achievement; Indian language and total school achievement; core subjects and elective subjects; core subjects and total school achievement; elective subjects and total school achievement are fairly high. This indicates that if a student obtains high marks in language (English - the medium of instruction, or an Indian language) he is likely also to obtain high marks on his total ($r=7690$ & 7049 for English and Indian language respectively). If a student obtains high marks in English, he is also likely to obtain good marks in his elective subjects. Furthermore, if a student obtains high marks in the core subjects he is likely to do likewise in his elective subjects and total school achievement. Putting it differently, if a student obtains high marks in total school achievement, he is also likely to do so in English, Indian language, his core and elective subjects.

Table V.1.3.

----- List of intercorrelations among the school achievement variables and the corresponding Zs for girls and boys.

Variables		Correlations		Z		Sig- nif. F
		Girls	Boys	Girls	Boys	
English	-Indian Language	.3735	.3239	0.3924	0.3360	
English	-Core subject	.4640	.5478	0.5024	0.6152	
English	-Elective subject	.6314	.5644	0.7438	0.6393	
English	-Total school achievement.	.7690	.7477	1.0179	0.9677	
Indian Language	-Core subject	.4044	.4444	0.4289	0.4777	
Indian Language	-Elective subject	.3692	.4548	0.3875	0.4907	
Indian Language	-Total school achievement.	.7049	.6917	0.8770	0.8513	
Core subject	-Elective subject	.6386	.6622	0.7559	0.7967	
Core subject	-Total school achievement.	.8190	.8328	1.1538	1.1972	
Elective subject	-Total school achievement.	.8248	.8349	1.1716	1.2042	

V.2. INTERCORRELATIONS BETWEEN REASONING, LANGUAGE, MEMORY AND SCHOOL ACHIEVEMENT.

Intercorrelations between the four types of variables (reasoning, language, memory and school achievement) are conveniently dealt with in six sections as shown below :

- V - 2.1 .. Reasoning and language
- V - 2.2 .. Reasoning and memory
- V - 2.3 .. Reasoning and school achievement
- V - 2.4 .. Language and memory
- V - 2.5 .. Language and school achievement
- V - 2.6 .. Memory and school achievement.

V. 2.1. Correlations between the reasoning and language variables.

It may also be noted from the matrix of intercorrelations that when the six language variables are correlated with each of the reasoning variables they display a consistent pattern each time. For example, all the six intercorrelations of the language variables with incomplete sets are in the .30's; all the six with combinations are in the .40's; all the six with verbal reasoning are in the .50's and all those with analogies are in the .30's. This is because the six language variables are closely related to each other.

V.2.2. Intercorrelations between the reasoning and memory variables.

The intercorrelations between memory and each of the reasoning variables do not differ by sex except that between memory and analogies which is just significant at the .05 level. The r for girls is higher than that for boys. The r for girls is .3662 while that for boys is .1831. This indicates that there may be some chances of the scores for memory and analogies both being high or low in the case of girls, but there is no such trend evident in the case of boys. Furthermore, all the intercorrelations between memory and reasoning variables are moderate in size.

Table V. 2.2.

Intercorrelations, Z and signif F of girls and boys for memory and each of the reasoning variables.

Variables involved.	<u>Intercorrelations</u>		<u>Z</u>		Sig.
	Girls	Boys	Girls	Boys	
Memory - Incomplete sets ..	.3620	.2237	0.3782	0.2275	
Memory - Combination ..	.3649	.2506	0.3725	0.2501	
Memory - Verbal reason ..	.3850	.4132	0.4050	0.4335	
Memory - Analogies ..	.3662	.1831	0.3840	0.1852	

V. 2. 3. Intercorrelations between the reasoning and school achievement variables.

The intercorrelations between each of the school achievement and every one of the reasoning variables are displayed in table V:- 2.3 for each of the sexes. Every one of the twenty correlations are alike for the two sexes. The intercorrelations between school marks in English and the scores of each of the reasoning variables are moderate; those between marks in Indian Language and each of the reasoning variables are poor. The correlations between core subjects and each of the reasoning variables are moderate; those between elective subjects and the reasoning variables are from low to moderate. Finally, the correlations between total school achievement and each of the reasoning variables are moderate.

V.2.3. (contd)..

TABLE V - 2.3.

Intercorrelations and Z for girls and boys
between the school achievement variables
and each of the reasoning variables.

Variables		Inter- Correlations		Z		Signi. F
		Girls	Boys	Girls	Boys	
English	-Incomplete sets	.3442	.2450	0.3588	0.2501	
English	-Combinations	.4257	.2862	0.4546	0.2945	
English	-Verbal reasoning	.4861	.5010	0.5309	0.5507	
English	-Analogies	.3250	.2413	0.3372	0.2461	
Indian Language	-Incomplete sets	.1996	.1369	0.2023	0.1377	
Indian Language	-Combinations	.1739	.2531	0.1757	0.2587	
Indian Language	-Verbal reasoning	.3161	.2603	0.3273	0.2665	
Indian Language	-Analogies	.1628	.2073	0.1643	0.2103	
Core subjects	-Incomplete sets	.4830	.3564	0.5269	0.3728	
Core subjects	-Combinations	.4623	.4429	0.5003	0.4759	
Core subjects	-Verbal reasoning	.5222	.5243	0.5794	0.5823	
Core subjects	-Analogies	.4776	.3816	0.5199	0.4020	
Elective subjects	-Incomplete sets	.2847	.3546	0.2829	0.3707	
Elective subjects	-Combinations	.3950	.3064	0.4177	0.3166	
Elective subjects	-Verbal reasoning	.4451	.4459	0.4785	0.4796	
Elective subjects	-Analogies	.2812	.3378	0.2890	0.3516	
Total school achiev	-Incomplete sets	.4243	.3439	0.4536	0.3585	
Total school achiev	-Combinations	.4655	.3986	0.5043	0.4220	
Total school achiev	-Verbal reasoning	.5653	.5359	0.6406	0.5984	
Total school achiev	-Analogies	.4048	.3614	0.4293	0.3764	

V.2.4. Correlations between the language and memory
Variables.

All the six intercorrelations between
memory and each of the language variables are alike for
the girls and boys, and all of them are of reasonably
good in size.

Table V. 2.4.

Intercorrelations and Z for girls and boys
between memory and each of the language
variables.

Variables	Intercorrela- tions.		Z		Sig- nif. F
	Girls	Boys	Girls	Boys	
Memory - Vocabulary	.4786	.4228	0.5212	0.4511	
Memory - Level of comprehension.	.5229	.4496	0.5803	0.4842	
Memory - Speed of comprehension.	.5383	.4376	0.6017	0.4692	
Memory - Total read	.5322	.4572	0.5932	0.4938	
Memory - English expression.	.5114	.4200	0.5647	0.4477	
Memory - Total English	.5457	.4795	0.6123	0.5223	

V.2.5. Intercorrelations between the language and
School achievement variables.

A total of 30 intercorrelations were computed between each of the five school achievement and each of the six language variables. The correlations of the language variables to each of the school achievement variables are dealt with separately in five different sub-sections.

From the matrix of intercorrelations and Table V. 2.5, it is evident that the correlations between the marks obtained in English from the school teacher are rather well correlated with those obtained for each of our six language variables, among both the girls and boys, though the intercorrelations for the girls are consistently higher than those for the boys. The correlations are as follows:

This indicates that the teachers measure about the same aspects of language as those evaluated by our objective tests and that the teachers in the girls schools do this better, to some extent, than those in boys schools.

The intercorrelations between the marks received in Indian language and the six language variables obtained from the cooperative English tests are all very moderate for the girls, but poor for the boys. Three of the six intercorrelations differ between the sexes at the .05 level. These are the correlations between Indian language and (a) vocabulary, (b) English expression and (c) total English score. In each case the correlations for the girls are higher than those for boys.

The intercorrelations between the school marks received in the core subjects and each of the six language variables are alike for the two sexes and moderate in size.

The intercorrelations between the school marks received in the elective subjects and each of the six language variables are from moderate to fairly high among the girls; but range from poor to moderate among the boys. The correlation between school marks in elective subjects and vocabulary is .5539 for girls and .3376 for boys. These two correlations differ significantly at the .01 level. This indicates that if a girl has a high score in vocabulary she stands a fairly good chance of obtaining high marks in the elective subjects also, but it is not equally true for boys. This indicates that the teachers in girls schools (women teachers) consider the number and variety of words used by a student in giving marks for elective subjects more than the teachers in boys schools (men teachers) do.

Why should this be? It may be recalled that almost half (46.97 percent) of the girls in our sample take humanities, 12.63 percent take home science, but only a third of them take science. On the other hand, over two thirds (67.03 percent) of the boys take science while only one fifth (20.98 percent) of them take humanities. Both humanities and home science often include streams to have a good grasp over language. Hence, it is possible that the teachers in girls schools in giving marks for elective subjects consider vocabulary as important. However, the teachers in the boys schools

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do not consider it equally important for their students to possess a fine command over vocabulary in order to perform well in the elective subjects, particularly the science subjects.

The correlations between marks obtained in elective subjects at schools and (a) total reading score, (b) English expression and (c) total English score differ significantly for the girls and boys at the .05 level.

These findings only confirm the hypothesis put forward in explaining why such a result should occur with vocabulary, if anything.

The intercorrelations between the total marks received in school and each of our language variables are all fairly high. This indicates that the student who attains high scores on our language tests is also the one who is likely to obtain high marks in school. To some extent, this is only natural. Language ability is considered one of the primary mental abilities by Thurstone and it is well correlated with general intelligence. Hence, the more intelligent student is likely to have a better language ability and possess a better academic record than a less intelligent one.

It is also observed that the correlations between total school achievement and (a) vocabulary (b) English expression are significantly different for the girls and boys. The correlations in the case of girls are higher than those for boys. This indicates that vocabulary and English expression contribute to total school achievement more in the case of the girls than in the case of the boys. The mode for the choice of the elective subjects is science for boys and descriptive subjects like humanities and home science for girls. For success in the descriptive subjects, it is more important for the student to have a good control over language than is the case for success in the science subjects. For example, a student of biology can explain in simple words, but a student of history sounds better if he describes.

Table V - 2.5.

Intercorrelations and Z for girls and boys between marks achieved in school and each of the language variables,

Variables	Inter- Correlations		Z		Sig- nif. F
	Girls.	Boys	Girls	Boys	
English-Vocabulary	.6038	.5354	0.6991	0.5977	
Level of comprehension	.5752	.5249	.6553	.5832	
English-Speed of comprehension	.5951	.5357	.6855	.5981	
English-Total reading	.6358	.5691	.7512	.6462	
English-English expression	.5584	.5465	.6306	.6134	
English-Total English	.6240	.6113	.7315	.7110	
Ind. Language -Vocabulary	.3386	.1294	0.3525	.1301	*
Ind Language-Level of comprehension	.3789	.2393	0.3988	0.2441	
Ind Language-Speed of comprehension	.2711	.2219	0.2781	0.2256	
Ind Language -Total reading	.3297	.1790	0.3425	0.1809	
Ind Language-English expression	.3396	.1251	0.3537	0.1257	*
Ind Language-Total English	.3519	.1775	0.3676	0.1794	*
Core subject - Vocabulary	.4511	.3996	0.4861	0.4232	
Core Subject -Level of comprehension	.4748	.4320	0.5163	0.4624	
Core Subject -Speed of comprehension	.4061	.4396	0.4310	0.4717	
Core Subject -Total reading	.4577	.4423	0.4944	0.4751	
Core Subject -English expression	.4683	.3756	0.5079	0.3950	
Core Subject -Total English	.4866	.4602	0.5316	0.4976	
Elective Subject-Vocabulary	.5529	.3376	0.6223	0.3514	**
Elective Subject-Level of compr	.5198	.4238	0.5761	0.4523	
Elective Subject-Speed of compr	.4822	.4292	0.5259	0.4589	
Elective Subject-Total reading	.5533	.4006	0.6231	0.4243	*
Elective Subject-English expression	.4517	.2888	0.4868	0.2973	*
Elective Subject-Total English	.5285	.3882	0.5881	0.4097	*
Total Sch achiev-Vocabulary	.6097	.4503	0.7084	0.4851	*
Total Sch achiev -Level of compr	.6117	.5048	0.7212	0.5557	
Total Sch achiev - Speed of compr	.5531	.5139	0.6228	0.5680	
Total Sch achiev- Total reading	.6207	.5069	0.7262	0.5585	
Total Sch achiev-English expression	.5779	.4200	0.6593	0.4476	*
Total Sch achiev-Total English	.6289	.5194	0.7395	0.5755	

* $P \leq .05$, ** $P \leq .01$

V. 2.6. Intercorrelations between memory and school achievement.

The intercorrelations between memory and each of the school achievement variables are alike for boys and girls. All the correlations are very moderate while that between memory and Indian language is low.

Table V - 2.6.

Intercorrelations and Z for girls and boys between marks achieved in school and memory.

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Variables	Inter- Correlations		Z		Sig.
	Girls	Boys	Girls	Boys	
Memory - English	.3680	.4229	0.3862	0.4634	
Memory - Indian language.	.1662	.1802	0.1678	0.1823	
Memory - Core subject.	.3274	.3144	0.3399	0.3255	
Memory - Elective subject.	.3290	.2514	0.3117	0.2570	
Memory - Total School achie.	.3775	.3705	0.3971	0.3890	

CHAPTER - VI

THE CONTRIBUTION OF REASONING AND MEMORY TO LANGUAGE ACHIEVEMENT AND THESE THREE TO SCHOOL ACHIEVEMENT

It was hypothesised by us in Chapter I that school achievement is determined by language achievement, reasoning and memory. We may, therefore, expect that school achievement can be predicted from the combined scores of the language achievement, reasoning and memory tests. School achievement here becomes the criterion variable while the language, reasoning and memory scores turn into predictor variables. Hence, we may find the weightage to be assigned to each of the language reasoning and memory test scores in order to obtain the best estimate of school achievement.

It was also hypothesised that language achievement as measured by the Cooperative English test is determined by reasoning and memory. We, therefore, expect that the scores on the reasoning and memory tests can be combined to predict the scores on the language achievement test. We are interested in discovering the weightage assigned to each of the reasoning and memory variables in order to obtain the best estimate of language achievement.

The results of regression analysis computed sexwise in finding solutions to the two above mentioned problems are displayed in Table VI-1. The discussion of the two problems is presented in two sections.

In the first section discussion of the results of the first problem including the contribution of language, memory and reasoning to total school achievement and achievement in the core subjects are presented. In the second section the results of the analyses about the contribution of reasoning and memory to language achievement are presented. Regression equations were prepared using each of following three language achievement variables as criteria: total English score, total reading score and English expression.

From the regression equations of the reasoning, language and memory variables on school achievement, it is noted that memory followed by verbal reasoning make significant contributions to total school achievement and the core subjects.

It is noted from regression equations of reasoning and memory on language achievement, that verbal reasoning, memory and combinations have significant regression coefficients when any one of the three Cooperative English test scores are used as criteria, and that the multiple correlations are quite high.

T.B.3 - VI.1.

REGRESSION EQUATIONS

Total school achievement		Incomplete sets	Comb actions	Verbal reasoning	analogies	Total English	Memory
Set 1.1 B	$y = -72.155$	-	$.0133x_1 + .7042x_2^*$	$+ .8525x_3^*$	$+ .4002x_4$	$+ .5097x_5^* + .9911x_6^{**}$	
Set 1.2 G	$y = -113.323$	+	$.2021x_1 + .7073x_2$	$+ .9001x_3$	$+ .3405x_4$	$-.0570x_5 + 1.5317x_6^*$	
Core Subjects							
Set 2.1 B	$y = -18.034$	-	$.0028x_1 + .3735x_2^*$	$+ .2919x_3^*$	$+ .1579x_4$	$+ .1001x_5 + .2098x_6^*$	
Set 2.2 G	$y = -25.0507$	+	$.2453x_1 + .2814x_2$	$+ .2874x_3$	$+ .3239x_4$	$-.0261x_5 + .2760x_6$	
Total English Score							
Set 3.1 B	$y = 96.733$	+	$.054x_1 + .2933x_2^*$	$+ .3698x_3^*$	$-.055x_4$	$+ .3011x_5^*$	(R= .67)
Set 3.2 G	$y = 87.084$	+	$.1038x_1 + .2656x_2^*$	$+ .3861x_3$	$-.1349x_4$	$+ .4488x_5^*$	(R= .70)
Total Reading Score							
Set 4.1 B	$y = 96.178$	+	$.0647x_1 + .2629x_2^*$	$+ .3541x_3^*$	$-.0754x_4$	$+ .3016x_5^*$	(R= .64)
Set 4.2 G	$y = 83.006$	+	$.0405x_1 + .3084x_2^*$	$+ .4092x_3$	$-.0935x_4$	$+ .4616x_5^*$	(R= .68)
English Expression							
Set 5.1 B	$y = 93.987$	+	$.0243x_1 + .2834x_2^*$	$+ .4077x_3^*$	$-.0376x_4$	$+ .3072x_5^*$	(R= .60)
Set 5.2 G	$y = 90.146$	+	$.1814x_1 + .2082x_2$	$+ .3746x_3$	$-.1850x_4$	$+ .4411x_5^*$	(R= .65)

VI.1 Contribution of reasoning, language and memory to school achievement

Through the technique of regression analysis, the contributions of reasoning, language and memory to school achievement were investigated for the core subjects and total school achievement. Regression equations were prepared for boys and girls for core subjects and total school achievement.

With total school achievement as the criterion and the four reasoning variables, total English score and memory as the six predictors, two sets of regression equations were prepared. They are displayed as set 1.1 and 1.2 in Table VI.1. Of these six predictors, the regression coefficients for incomplete sets and analogies make no real contribution to the prediction of total school achievement among boys. The regression coefficient for combinations is .7042 and for total English score it is .5097. Both these coefficients are significant at the .05 level. The coefficients for verbal reasoning and memory are .8625 and .9911 respectively. These two Bs are significant at the .01 level.

Among the girls the regression coefficients for incomplete sets, combinations, analogies and total English score make no significant contribution to the prediction of total school achievement. The coefficients for verbal reasoning and memory are .9001 and 1.5817 and significant at the .01 level.

The multiple correlations are .6118 for boys and .6909 for girls. This indicates that the relationship between total school achievement and the composite of our six predictors is quite good, even though the correlations between total school achievement and each of the 4 reasoning and one memory variables are very moderate. The correlation between total school achievement and total English score is .6289 for girls & .5194 for boys.

Using the marks achieved in the core subjects as criterion and the four reasoning variables, total English score and memory as predictors, two regression equations were prepared for boys and girls. They are displayed in Table VI.1 as sets 2.1 and 2.2.

The regression equation for the boys is as follows:

$$y = -18.034 - .0028 x_1 + .3765 x_2 + .2919 x_3 + .1579 x_4 + .1001 x_5 + .2098 x_6$$

with y = marks received in the core subjects,

x_1 = incomplete sets,

x₂ = combinations,
x₃ = verbal reasoning
x₄ = analogies,
x₅ = total English score,
x₆ = memory.

The regression coefficients for incomplete sets and analogies and total English score make no significant contribution to the prediction of school marks in the core subjects. On the other hand the Bs for combinations, verbal reasoning and memory are significant at the .01 level.

From the regression equation for girls it may be noted that the regression coefficients for incomplete sets and total English score make no significant contribution to the prediction of school marks in the core subjects. The coefficients for combination, verbal reasoning, analogies and memory are .2814, .2874, .3239 and .2760 respectively. All these four coefficients are significant at the .05 level.

The multiple correlations in this case are .5943 for boys and .6325 for girls.

VI.2 Contribution of reasoning and memory to language achievement

In order to investigate the contribution of reasoning and memory to language achievement, the technique of multiple regression analysis was used. Separate equations were prepared for boys and girls. Three sets of equations were prepared with total English score, total reading score and English expression as criteria and five predictors comprising of the four reasoning and one memory variables.

The first set of equations (sets 3.1 and 3.2 in Table VI.1) use total English score as the criterion with incomplete sets, combination, verbal reasoning, analogies and memory as the predictors. The regression coefficients for incomplete sets and analogies are low and make no significant contribution to the prediction of total English score, while those for combinations, verbal reasoning and memory are significant at the .01 level. The regression coefficients for combinations are .2263 for boys and .2656 for girls; those for verbal reasoning are .3698 for boys and .3881 for girls; while for memory they are .3011 for boys and .4488 for girls. It may be noted that all the coefficients are somewhat higher for girls as compared to the boys. The multiple correlation is .6726 for boys and .7022 for girls.

The second set of regression equations (sets 4.1 and 4.2 in Table VI.1) use total reading score as the criterion variable with incomplete sets, combinations, verbal reasoning, analogies and memory as predictors. The regression coefficients for incomplete sets and analogies make no real contribution to the prediction of total reading score. The Bs for combinations, verbal reasoning and memory are significant at the .01 level. The regression coefficients for combinations are .2629 for boys and .3084 for girls, for verbal reasoning they are .3541 for boys and .4092 for girls; while those for memory are .3016 and .4616 for boys and girls respectively. It may be noted that the regression coefficients for all the three predictors which make a significant contribution to the prediction of total reading score are somewhat higher for the girls as compared to the boys.

The multiple correlations are .6414 for boys and .6877 for girls.

The third set of regression equations (sets 5.1 and 5.2 in Table VI.1) use English expression as the criterion with the four reasoning and one memory variables as predictors. The Bs for incomplete sets and analogies are not significant, but those for combinations, verbal reasoning and memory are significant at the .01 level. The significant regression equations are as follows: .2884 and .2082 for boys and girls respectively for combinations .4077 and .3746 for boys and girls respectively for verbal reasoning and finally for memory it is .3072 for boys and .4411 for girls.

The multiple correlations are .6066 for boys and .6565 for girls.

It has been noted from every one of the three sets of equations that verbal reasoning, memory and combinations make significant contributions to the prediction of each of the three language variables, that were employed as criteria namely English expression, total reading and total English score. The multiple correlations are the highest when total English score is used as the criterion. This is because the intercorrelations of the three predictors are higher with total English score than with either English expression or total reading score.

CHAPTER - VII

INTEGRATION OF THE RESULTS AND DISCUSSION

VII.1 Background and Problems

The present survey was undertaken in 18 English medium high schools in Calcutta. All the students of Class 10 were tested in the schools selected randomly by using the stratified sampling technique with proportional allocations. In our sample were included girls' schools and boys' schools preparing their students for one or two of three types of school leaving examinations, the Indian School Certificate, Higher Secondary and School Final. Though the medium of instruction in all these schools was English, the students offered English either as a first or second language at the School Leaving Examination.

The problems to which answers were sought are as follows:

1. The standards attained by high school students in English medium schools with reference to English language achievement, reasoning and memory.
2. Comparison of the performance of different groups of students in language, reasoning and memory.
3. The inter correlations among the 6 different language, 4 reasoning and 5 school achievement variables and between the language, reasoning, memory and school achievement variables.
4. The contribution of language, reasoning and memory to total school achievement and achievement in the core subjects.
5. The contribution of reasoning and memory to language achievement.

(VII.2 Findings

The results of the investigation follow the order which is used in presenting the problems:

VII.2.1 Standards attained in language, reasoning and memory.

The means of the percentage items passed for the reasoning tests are as follows: 15.6832 for combinations, 21.5168 for incomplete sets, 29.2265 for analogies and 71.6124 for verbal reasoning. This

indicates that on the whole the students in the sample found verbal reasoning, the easiest of the four reasoning tests administered by us, analogies more difficult than verbal reasoning, incomplete sets more difficult than analogies and combinations was the most difficult of the four.

The means scores of the language variables for our sample are: 144.3681 for vocabulary, 145.1009 for level of comprehension, 142.4673 for speed of comprehension 143.6708 for total reading score, 146.1717 for English expression and 145.1009 for total English score. These scores compare well with those obtained by Grade 9 students in the U.S(Cooperative English Tests 1960, Technical Report p.14).

It may be recalled that our sample of students is drawn from class 10. Our sample includes those students who offer English as a first language and those who offer it as a second language. The students learning English as a first language obtain scores equivalent to those obtained by US. Grade 10 students on 5 variables (vocabulary, level of comprehension, total reading score and total English score. For level of comprehension, their mean score is comparable to that obtained by students of Grade 9 in US.

The mean scores of the students learning English as a second language are well below those obtained by students of Grade 9 in the U.S. It is doubted whether they may even be equivalent to scores obtained by Grade 8 students in the U.S. The girls of this group obtain much lower mean scores than the boys. It may be recalled that these students attend schools where the medium of instruction is English. What would be the standard of attainment in English among the students in schools where the medium of instruction is an Indian language can only be imagined.

The mean score of the total group on the Wechsler Memory scale is 61.9150. The boys attain a score of 61.5150 while the girls attain 62.6566.

VII.2.2 Comparisons of the Performance of Different Groups

- (a) School: From a comparison of the performance of the 18 schools in our sample, we find that the schools differ significantly from each other on the reasoning, language and memory tests administered by us. The chi squares for every one of the eleven variables

are significant at the one percent level. This difference among the students of the different schools is only natural. It could be traced to the innate differences in the students' capacities, differences in the teaching techniques used by the teachers, the type of examination for which the students prepare, their interests, aptitudes, their values and the opportunities they have.

- (b) Sex: On comparing the performance of boys and girls it was discovered that there is no significant difference among them on the reasoning variables with the exception of verbal reasoning. The boys do just significantly better than the girls on verbal reasoning. For the language and memory tests again the boys and girls are on a par except on level of comprehension where the girls achieve just significantly higher scores than the boys.
- (c) Examination: Comparisons of the students preparing for the Indian School Certificate, Higher Secondary and School Final examinations at the end of the high school reveals that the three groups differ significantly on all the reasoning, language and memory variables. There is a significant difference in the means of the students of the three examination groups whether one considers the boys, the girls or the total group. The Indian School Certificate students are the best followed by the Higher Secondary while the School Final students have the lowest mean scores for all the eleven variables. Furthermore, the difference between the mean scores of the Indian School certificate and Higher Secondary is larger than that between the Higher Secondary and School Final. It may be recalled that three out of the four reasoning tests used are non-verbal. Hence, the results cannot be traced to differences in language achievement.

As to the reasons why these results have occurred, there may be some basic differences in the syllabi of the three examinations, the way the students are taught and perhaps a basic difference in the type of students who are admitted to these three types of schools. Comparisons of syllabi, techniques of teaching, the intellectual level and the home backgrounds of these three groups could be fruitful and revealing.

A comparison of the syllabi and examination papers of the ISC, Higher Secondary and School Final would most likely reveal interesting differences. The ISC examination questions require the candidate to think and reason more than those of the other two examinations. School teachers at the high school teach the syllabi basically to prepare their students to answer the questions of the school leaving examination. If the ISC questions require a student to reason then the teachers are more likely to give their students practice in answering those type of questions and hence practise in reasoning. If, on the other hand, the Higher Secondary or School Final question papers merely ask for facts, then the teachers preparing students for these examinations are likely to give the students practice in presenting facts rather than in reasoning. It is said that man by nature is a lazy creature. Teachers and students are no exception to this rule. Hence, it is not just what is taught, but how it is taught that makes the difference between producing students who can reason the answer to a problem in life and those that cannot.

The syllabi of the ISC, Higher Secondary and School Final may not differ radically on the face of it, but the interpretation of this syllabi is made by the teachers teaching the courses. The interpretation made by the teachers while the standards to be maintained are determined by the examination. The examination, therefore, sets the standards at the secondary stage in education. If there is a difference in the performance of students belonging to the different examination sections, there must surely be a difference in the question papers set at the three examinations.

It may even be possible that the better type of student, the more intelligent student with a favourable home background, prefers to take the ISC rather than the Higher Secondary or School Final.

Every student preparing for the ISC is forced to learn English as a primary language. The standard of English at the ISC examination has always been higher than that at the Higher Secondary and School Final examinations. In addition, the standards of English have fallen sharply in recent years at the Higher Secondary and School Final examinations.

Now as a consequence, the ISC students are much better equipped to comprehend and express themselves in the language which is the medium of instruction.

They are better able to understand what their teachers teach and their books say and their minds are free to concentrate on thinking and reasoning. They are, therefore, likely to indulge in thinking and reasoning rather than rote learning. Since they have a surer grasp on the vocabulary and expression of the language, which is the medium of instruction, they are also better able to express and explain what they know at the examination, which is the criterion of academic success. Even when it comes to memorizing, these ISC students would most likely learn more easily and remember better, because what they learn is more meaningful to them than it would be if they did not really understand it.

- (d) Subject: Comparisons of the scores attained by the students of the different subject streams reveal that their performance differs significantly for all the eleven variables in the case of the total group and also the girls group. For the boys, the means do not differ for one reasoning variable (combinations) four language variables (level and speed of comprehension, total reading and English scores) and for memory. The performance of the boys of the different subject groups differs significantly for three of the reasoning variables (incomplete sets, verbal reasoning and analogies) with chi squares significant at the .01 level. The boys of the different subject groups perform just significantly differently for English expression.

The science students, both boys and girls obtain the highest mean scores for all the four reasoning variables while the humanities students (both girls and boys) obtain the highest mean scores for four of the six language variables with the exception of level and speed of comprehension. On the other hand, it is the commerce boys and science girls who obtain the highest scores for memory. With a good memory and capacity to reason, the science girls seem better equipped for success in science than the science boys in our sample. The home science girls obtain the lowest average scores in every one of the reasoning, language and memory variables. Does this indicate that the girls who are poor at reasoning, language and who also have poor memories compared to the others, choose home science in the high school?

The commerce boys consistently obtain the lowest average scores on every one of the reasoning and on most of the language variables though they have

the highest scores on memory. This result is an indicator of the syllabi, teaching and evaluation of the commerce course at the high school level. Do we take it that the commerce students require memory rather than reasoning and language for academic success?

The boys and girls of the science and humanities streams produce high mean scores on all the reasoning, language and memory variables while the commerce-technical boys and the commerce-home science girls generally have low scores on our tests. This indicates that the better students choose science and humanities while the rest select the commerce, technical and home science courses.

- (e) English: Though the present investigation was undertaken in English medium schools, that means schools that teach all the subjects (except languages) through English, all the students in these schools do not prepare to offer English as their first language at the school leaving examination. All the students preparing for the Indian School Certificate examination had to offer English as the primary language, but those preparing for the higher secondary and school final had a choice. They could answer their questions in the different subjects through their mother tongue, hence not many of the higher secondary and school final students learnt English as a first language.

Comparisons of the students learning English as a first language and those learning it as a second language reveal that the first language students fare better than the second language ones on all our reasoning, language and memory tests whether we compare the boys, girls or the total group.

Several reasons could be offered in explaining this phenomenon. To begin with the second language student does not fare as well as the first language, because the aims of learning English as a first language and second language are quite different. Furthermore, in all the years that the reins of authority and Government were held by the British, it was considered natural for Indians to learn English without any thought being given to the peculiar difficulties encountered by Indians in learning it. Today it is recognised that English occupies the position of a foreign language and therefore, should be taught as such. Only recently, newer books have begun to be written, newer

techniques of teaching explored and the aims of teaching English recast to suit our needs and those of our children. These have not yet made an impact on, and been accepted by the ordinary classroom teacher in the school. Most of the practising teachers continue with their outmoded techniques for better or for worse. With defective readers full of errors, inadequate audio-visual aids and faulty methods of teaching, it is no wonder that the standards of English are low. Besides, not being sure of the future of English in India many teachers and students do not take it seriously, especially those learning it as a second language. Perhaps the better type of student comes from the English speaking home and at school chooses to learn English as a first language. The student who is educated in an English medium school and learns English as a first language practises this one language to perfection while concentrating little on the second language. The student taking English as a second language, on the other hand, has his attention divided between that language which he learns as the first language and English. As a consequence, he does not really master English well. Furthermore, all IS students learn English as a first language while only a few of the Higher Secondary or School Final ones do so. The results of the comparisons made on the basis of examination sections have revealed that the ISC girls and boys are superior to the Higher Secondary and School Final girls and boys on reasoning, language and memory.

It has also been observed that the teachers in some of these English medium schools where English is a second language are not very fluent in English and sometimes use an Indian language to explain the lesson to the students, many of whom come from homes where the parents do not speak English frequently. Hence, though the school is called English medium, neither the students nor the teachers are really fluent at English. No wonder then that those students are inferior to those who take English as a first language in our language tests.

As to why the second language students have fared poorly on the reasoning tests, it may be recalled that the majority of students taking English as a first language are from the ISC section.

It has further been noticed that the means of the first language, girls are higher and those of the second language girls lower, than their male counterparts for every one of the language and memory

variables. This indicates that the first language girls are somewhat superior to the first language boys, but the second language girls are inferior to the second language boys. On the reasoning variables, however, the girls and boys fare alike.

- (f) School Type: The schools in our sample can be stratified into three types: (1) those charging high fees and attracting the children of rich businessmen, successful professional people and high officials in the Government and armed forces classed as type I; (2) those that charge between Rs 25/- to Rs 35/- per month and attract the children of the educated professional parent who cannot fling money about and yet would make sacrifices to educate his children well, being classed as type II and (3) those charging less than Rs 25/- per month and attracting the children of tradesmen who have acquired money and now desire education and the half impoverished middle class, classed by us as type III.

Comparisons of these three types of schools reveal that they differ significantly on every one of the reasoning, language and memory variables. The students of the type I schools consistently produce the highest mean scores on all the eleven variables followed by those of type II schools, while the type III schools have the lowest mean scores. This indicates that the children from type I schools can reason better, have a better control over language (English) and have better memory scores. This is not very surprising.

The explanation of this difference between the more expensive and the cheaper schools partly lies in the type of children these three types of schools draw; their home background, their upbringing, experiences and the opportunities they have for improving themselves intellectually and linguistically. The children in our type I schools come from economically and educationally favoured homes, many of whom are brought up in the lap of plenty. They do not lack for toys, books and other educational media like the radio and movies to mention only two. They are often surrounded by educated adults and have the opportunity of listening to discussions among adults and sometimes participating in them, besides the boon of travel during holiday time. The children from our type II schools have the company of educated males in the home though the females (mothers and grand-mothers) may not always be very educated. Besides that, the women of the family often attend

to the household chores like cooking, sewing and washing and have little time and still less money to devote to intellectual pursuits or to the intellectual development of their children besides helping them with their homework. The children play with whatever toys they find or spend their time with physical games and gossiping in the company of others of the neighbourhood who have similar backgrounds. The children of our type III schools not only come from uneducated parentage, but often lack the equipment that can stimulate intellectual growth. Hailing from an impoverished economic and educational background, these children often have the added burden of sharing whatever little they have with their many siblings and assuming responsibilities beyond their level of development. More often than not these children walk to school. Even to take a bus ride to the other side of town may be a dream that takes years to fulfil, for, though the tradesman father has some money, he lacks the insight to provide such experiences for his children. The children therefore grow up in the world of the neighbourhood and learn to think and talk like their neighbours.

It is not only the children from the three types of schools that differ, but the schools differ too. A school that charges high fees can afford to pay its teachers better than one which charges little or no fees. As a consequence, the more expensive school can attract better teachers and teachers who come from backgrounds somewhat similar to those of the children whom they teach. Furthermore, a more expensive school can provide educationally better equipment by way of a well stocked library, audio-visual aids and laboratory apparatus to help the teacher in his daily task. The stage is therefore set in the expensive schools with better sets, better actors and a better play to produce better results.

It has also been noted that the mean scores obtained by the children from type I and type II schools are more alike than the type III schools. Types I and II schools cannot afford to differ much from each other. The parents of children in type II schools do not have excessive wealth, but they themselves are educated and value education highly. Hence, not only are they prepared to make sacrifices in terms of time, effort and money, but they expect more from a school than the parents of children in type I children would. These educated professional parents of type II schools lead hard lives in the India of today and they expect to obtain one hundred and fifty paise worth of education for every rupee they pay the schools.

VII.2.3 Intercorrelations among and between the language, reasoning, memory and school achievement variables

The intercorrelations among the reasoning variables are moderate while those among the language variables are high. The correlations among the reasoning variables are as expected. The reasoning tests are factorial tests and should produce poor correlations. The correlations among the school achievement variables vary from moderate to high. From the correlations it may be concluded that a student obtaining high marks in total school achievement, is also likely to obtain high marks in English, in the elective subjects, in the core subjects and in Indian language. A student obtaining high marks in the elective subject also is likely to do so in English and in the core subjects. From these intercorrelations we obtain proof of the concept of the integration of all aspects of school achievement. A good student displays good performance all round.

The intercorrelations between each one of the six languages and any other variable display a similar pattern since the language variables are highly related. The only correlations between the language and reasoning variables worthy of note, though moderate, are those with verbal reasoning. The results between reasoning and memory are very moderate.

Of all the correlations between the school achievement and reasoning variables, the only ones worthy of note are those of each of the four reasoning variables with the core subjects. These four correlations are of the magnitude of between .46 and .52 while the rest are low with the exception of those with verbal reasoning. The intercorrelations of the language variables with memory are reasonably good.

Of the 30 intercorrelations between the language and school achievement variables those of English, elective subjects and total school achievement with the six language variables are fairly good. The good intercorrelations between language and English are indicative of the validity of the marks given by the school teachers. The teachers seem to evaluate the students in about the same way as the cooperative English tests used by us. Furthermore, there is a just significant difference in the intercorrelations between the boys and girls for language - elective subjects and language - total school achievement. The correlations for the girls are consistently higher than those for the boys.

VII.2.4 The contribution of language, reasoning and memory to school achievement and achievement in the core subjects by sex

It was discovered that the contributions made by the language, reasoning and memory variables to school achievement was not exactly similar for the two sexes. In the case of boys memory, verbal reasoning, combinations and total English score make significant contributions to total school achievement in descending order of magnitude. For the girls, only memory and verbal reasoning make significant contributions to total school achievement.

Using the marks achieved in the core subjects as criterion with reasoning, language and memory as predictors we find that combinations, verbal reasoning and memory make significant contributions for boys while analogies, combinations, verbal reasoning and memory make just significant contributions in the case of girls.

From these results it is evident that memory makes the largest contribution towards total school achievement for both the sexes followed by verbal reasoning. This may lead one to think that perhaps total school achievement depends a lot on memory of subject matter and a little on reasoning. If students are given marks in the examination on their ability to recall and reproduce what they have learnt, and not for their ability to reason with subject matter, surely parents are justified in their criticisms of the existing school system. It seems as though our school system fails to help children to develop the mental ability required for reasoning with different types of subject matter. Certainly, this ability does not seem to help students towards higher school achievement.

VII.2.5 The contribution of reasoning and memory to language achievement

In investigating the contribution of reasoning and memory for language achievement as measured by the Cooperative English test, we notice that the regression coefficients for the two sexes are similar. For language, three sets of regression equations were computed using total English, total reading and English expression scores as criteria. In the case of every one of the three criteria of language, verbal reasoning, memory and combinations make significant contributions.

VII.3 Observations and suggestions in the light of the findings

1. It is evident from our investigation that students who prepare to offer English as a second language are at least two years behind those who offer it as a first language in their attainment in English. Both these groups of students enter the University together where the medium of teaching is English. In order to help the students who have offered English as a second language, it is suggested that special concentrated courses in English language be offered by the colleges for these students so as to help them to comprehend what their teachers teach and to express themselves easily.
2. In view of the sharp differences in performance of students from the three examination systems, it is recommended that some study of the syllabi, the techniques of teaching and evaluations used and of the pupils of the three systems of education leading to the ISC, HS & School Final examinations be undertaken to trace the causes for the difference in performance among these three groups of students.
3. It seems to us from the present survey that the best students select, or are selected for, the science stream and the poorest educational potential is to be found in the technical and home-science streams. This result gives the impression that student placement may not be wholly made on the basis of aptitude and that the technical and home-science streams in English medium schools are not considered respectable enough for a good student to follow. To draw the better student to these two streams and thus ease the pressure for admission to ordinary colleges, it is necessary that the status of these two subjects be improved by bringing about a change in the attitudes of young people and their families. This can be done by providing well designed courses, avenues of specialization and employment and also by providing a good guidance and placement service.
4. The students of the schools charging higher fees fare better than those charging less. Though there is bound to be some difference in the innate capacities of the students from the richest as compared to those from the poorest schools, much can and should be done to improve the wares offered by the poorer schools. The parents of the children from

the expensive schools have the means to supplement the classroom education of their children and thus make up some of the loses. It is all that a poor parent can do to sacrifice the help a child would normally provide in the home and send him to school. The school for such a child therefore has to assume a greater responsibility for the education of its pupils than its richer counterpart. Such a school must provide many more services, employ versatile teachers and equipment to ensure that its pupils have the experiences that they miss in their home and neighbourhood. The poorer schools which cannot employ many specialists require teachers, who have the qualities of the 'jack of all trades': men and women who are not only dedicated to the profession, but are versatile. Cheap multipurpose toys and equipment which can be put to more than one use should be made available to the poorer schools. Some liason must be maintained between the home and the school. Inter-school competitions, other than those in sports and exchange of teachers could be beneficial in helping the poorer schools to improve their standards. Meetings among teachers to discuss special problems, refresher courses and a statewide loan service for books, magazines and the more expensive educational equipment would put the students from poorer schools on the road to comparative educational prosperity. These types of tasks can easily be handled by the extension services unit.

It was noted that memory makes a major contribution to school achievement while reasoning plays a comparatively minor role. The criteria and pattern of evaluation followed in the school is dictated by the Board of Secondary Education. The schools follow the trend set by the school leaving examination. If the school leaving examination questions are set in such a style as to lay greater stress in evaluating the extent to which a student can reason with different types of subject matter, the school teachers are bound to follow suit in evaluating their pupils. It is therefore urged that the techniques and concepts of evaluation used at the school leaving examination undergo a change and the weightage assigned to reasoning be increased. This in its turn will awaken the desire for a revolution in text-book writing and techniques of teaching.

An insight into the new techniques of evaluation would aid in improving our examination system and as a natural consequence, the quality of teaching. The shift in emphasis in classroom teaching would help to fulfil the aim of producing better students and thus satisfying the aim of education. If educators view their profession as a scientific exercise and set about their jobs as scientists, they are

more likely to attain excellence to discover improved techniques of teaching, to speed understanding and facilitate the child's progress toward the ultimate reaches of his learning capacity.

The teacher and child are aided in their tasks by the text-books they use. A study of text-books used by school children would reveal that great numbers of them poured over through interminable school hours are written in language which would be intolerable anywhere else. They contain nothing by way of art which can be used as a model by either the student or teacher. The subject matter is neither well-ordered nor developed systematically and logically. Further more, the illustrations used lack imaginativeness. It is essential that the text-books that students use in our schools be re-written with an eye, not only on presenting the subject matter, but presenting it with lucidity and with a view to set an example of logical thinking that each child could emulate.

The clear understanding of meaning and its communication is of central importance in the educative process. To ensure the full development and use of the child's facility with words in a country like India, where the constitution officially recognises fourteen languages and ensures an equal status to each, is a complex problem. With the trend, as one sees it, towards encouraging education through the medium of the State languages, the possibility that the different States will tend to perceive more social-cultural and linguistic differences among themselves than ever before is increasing daily. The various forces of disintegration are gathering momentum. The division of the country into linguistic States, each proud of its culture and language is increasingly encouraging the people to adopt parochial attitudes with pride in being Bengali, Maharashtrian, Punjabi or Tamilian rather than thinking of oneself as an Indian first and foremost. Indians who are desirous of finding employment in other than their own States, today have a common language in the form of English that enables them to live in any part of India. In the future, such pioneers would of necessity have to possess a knowledge of all the 14 official Indian languages and at least as many dialects if they are to hold transferable jobs, and their children in turn will be forced to spend their educational careers learning new languages each time they move from one State to another. If either the parents or children lack linguistic aptitude, they would be handicapped

in more than one way. They would not be able to make friends, mix freely, function effectively and get on with the people of the State in which they live and work. One shudders to envisage the ultimate consequences of the yawning chasm which - increases daily between the people as a consequence.

Whatever be the emphasis placed on encouraging the various State languages and the final decisions about unravelling the language tangle, India is a multilingual nation and is likely to remain so for a long time to come. In view of this, the approach to the teaching of language prescribed and followed by our school curriculum is extremely parsimonious and narrow. Our students spend years at drill with correct grammar and reading a few despicable pieces of literature. Some of the more subtle characteristics of language as an instrument for the communication of varied meanings find no place in our curricula. With the introduction of the 3-language formula our students learn the medium of instruction, the State or national language and a third language, without ever discovering the areas of similarity and difference between them. Many of the Indian languages are derived from Sanskrit or Pali. Insight into the structural similarities between the languages a child learns from the linguistic standpoint would help a child to master a new language with greater facility. "A child should have brought to his attention whatever knowledge will most help him to adjust himself successfully to his world" said Leta Stetter Hollingworth (1926). The child in India certainly needs to be acquainted with a number of languages in order to be successfully adjusted to his environment.

Since our youth must function in an environment which is multilingual with little hope of conversion to unilingualism in the immediate future, language instruction to be most fruitful, should be levelled particularly at language in general: at language problems and phenomena like phonetics, semantics, morphology and structure. By using illustrations of the usages in particular languages which belong to a family we can lay the foundation for a child to master any language of a particular family easily when the necessity arises. It is not suggested here that a child learn too many languages as such, but that through graded instruction in the universal characteristics of language, with illustrations from allied languages of the same family, he learn to be resourceful enough to adapt to the linguistic demands made on him as an adult.

It is true that not every child has linguistic aptitude or will need to adapt himself to a multi-lingual situation. This is particularly true of the rural Indian today. Yet, it is envisaged that with the stretching of the power grid, the linking of our remotest villages by means of roads and rail, the introduction of modern mechanised methods of farming, the growth of industry, the improvement of education and movement of population, the villager of tomorrow will have more opportunities of meeting and dealing with people who speak languages other than his own. That villager of tomorrow is the child of today who must be sensitized to at least some of the major languages of his country.

APPENDIX-A
PRACTICAL ASPECTS OF THE PROJECT

For the Extension Service Units to wield any influence with the schools they must be acceptable to the schools. The schools are likely to accept the units when they realize that the units render valuable service and that they are useful in solving their particular problems. The units must, therefore, establish and maintain good relations with the schools, bring new ideas to the schools, make them enthusiastic about change and give them an appetite for progress. The units must be a common meeting place for teachers and administrators, where they can bring their problems, discuss them with others, exchange views and finally learn to work cooperatively as a fraternity.

The services initiated by the Extension Services Units would yield rich dividends if they are based on factual needs. The Extension Services Units should, therefore, be interested in factual information, scientifically collected, which touches the ordinary school and child. Since this particular project was undertaken through an Extension Services Unit, it was considered important that the research project be of some benefit to the schools and the children who so ungrudgingly provided our data. In view of this the following activities were undertaken by us:

1. Cooperation was solicited from the schools before the testing was undertaken. Requests were made for the school teachers to be present at the testing sessions to arouse interest by showing them our tests, preparing them to participate later in other programmes and to make them feel a part of our exciting activity. All this was done to arouse enthusiasm among the teachers to initiate innovations in the school.
2. Letters of thanks were sent to principals, teachers and students to maintain good relations.
3. Comparison of the performance of the 18 schools of our sample on the tests of language, reasoning and memory administered to them indicate that the schools differ significantly from each other. Every one of the eleven chi squares on the four reasoning, six language and one memory variables are significant at the one percent level. The impression gathered from a study of the data is that school numbers 1, 10 and 11 display consistently poor scores in the reasoning and language tests though their scores for the memory test are not so poor as to place them at the bottom of our list of 18 schools. School 18 consistently produces the

highest scores for every one of the reasoning and language variables. Two girls schools (7, 9) and one boy's school (18) consistently produce the highest scores in language achievement.

Results of all our tests were presented to schools with explanatory notes and suggestions for use so as to give the schools a chance to see themselves and their pupils objectively and to give them a chance to initiate changes in their schools.

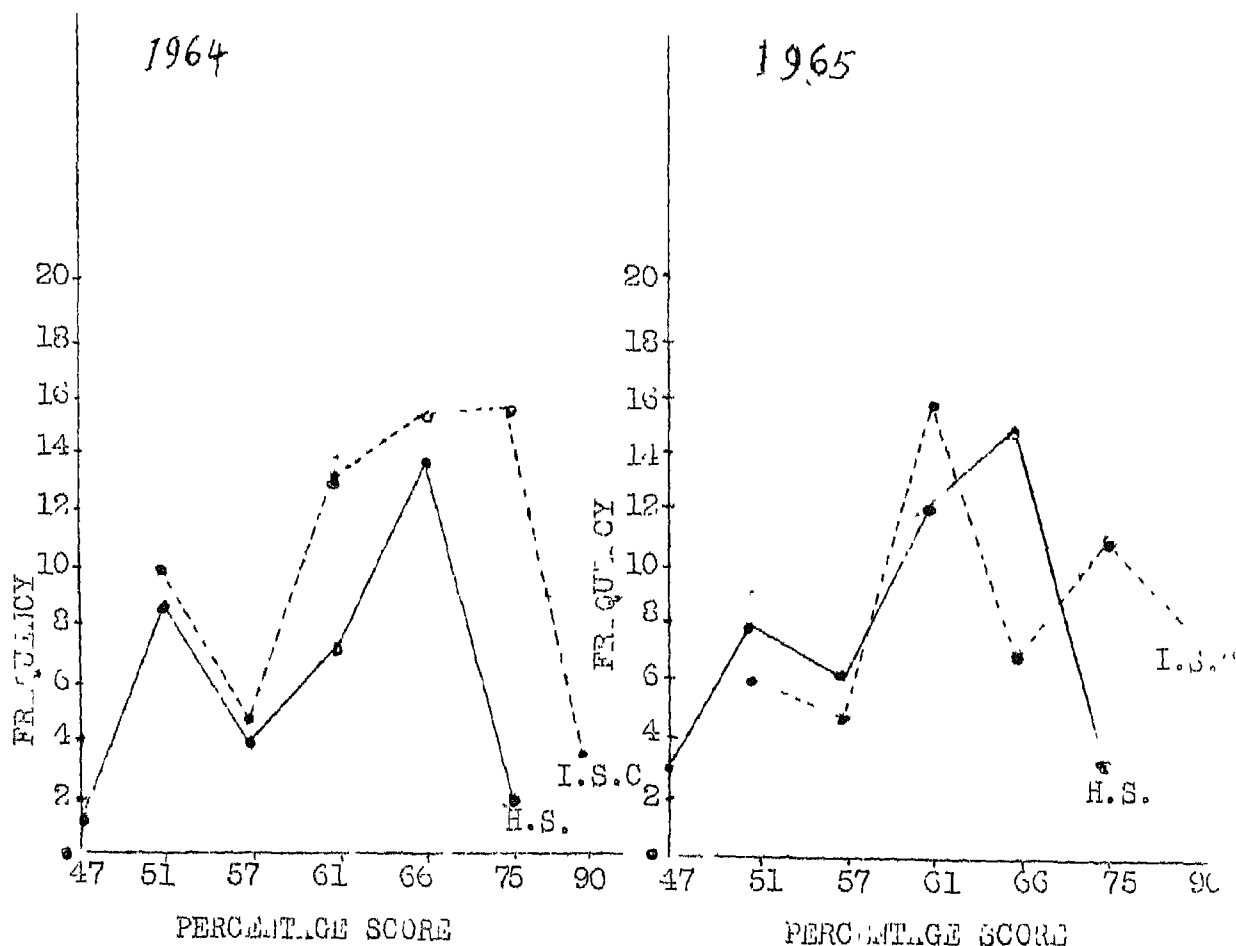
4. Letters were sent to schools asking for comments, information about the changes initiated on the basis of the test results supplied by us, the specific problems faced by them and the kind of help they desire. It is believed that the schools must perceive their own problems and want help. It is useless for an outside agency like the Extension Services Unit to try and force any changes on them from the outside. Innovation like discipline is best when it comes from within.
5. Prediction of future school achievement: Prediction of school marks one year later was undertaken. In order to demonstrate how such prediction can be made, one school with two examination streams (Indian School Certificate and Higher Secondary) was selected. Prediction of the performance of 102 students from school No.18 was undertaken. The students were classified into two groups according to their examination streams and these two groups were dealt with separately. The distribution of the students of the sample school is as follows:

<u>Examination Stream</u>	<u>No. of students</u>
Indian School Certificate ..	65
Higher Secondary (Science) ..	28
Higher Secondary (Commerce) ..	9

The marks obtained by students from school No.18 at the ISC and Higher Secondary examinations in the two previous years were collected. The assumption underlying the technique used for making predictions is that a school tends to obtain about the same kind of results in the school leaving examination every year as is seen from distribution of the data of 2 previous years.

TABLE A-1

FREQUENCY DISTRIBUTION OF THE AGGREGATE PERCENTAGE SCORES
OBTAINED BY STUDENTS BELONGING TO THE TWO EXAMINATION SECTIONS.



Considering the H.S & ISC marks separately, we find the mean M_1 from the n_1 observations in 1964 and the mean m_2 from the n_2 observations in 1965.

The common mean for the two years is given by the following formula

$$M = \frac{n_1 m_1 + n_2 m_2}{n_1 + n_2}$$

The combined means and standard deviations of the ISC and Higher Secondary groups in previous years are displayed in Table A-2.

TABLE A-2

<u>Examination Stream</u>	<u>Mean</u>	<u>SD</u>
ISc	.. 82.9495	5.7776
H.S (Science)	.. 678.8	55.249
H.S (Commerce)	.. 570.0294	50.3394

The mean marks obtained by the ISc group in previous years is 82.9495 with a SD of 5.775. The means of the Higher Secondary students are 678.8 for the Science group and 570.0294 for Commerce.

The correlation matrix for boys displayed in Table was factored using the principle factor solution. The principle factor loadings for the language and reasoning tests are displayed in Table A-3.

TABLE A-3

	<u>Set</u>	<u>FACTOR LEADINGS</u>	
		<u>Boys</u>	<u>Girls</u>
1	Incomplete sets	0.5188	0.5246
	Combination	0.4586	0.4787
	Verbal reasoning	0.5117	0.4828
	Analogies	0.5087	0.5124
2	Vocabulary	0.5047	0.5043
	Level of comp	0.4974	0.4985
	Speed	0.5206	0.5075
	English expression	0.4762	0.4895
3	Incomplete sets	0.2815	0.2889
	Combination	0.2875	0.2917
	Verbal reasoning	-0.3620	-0.3279
	Analogies	0.2643	0.2700
	Vocabulary	0.3651	0.3716
	Level of comp	0.3839	0.3822
	Speed of compr	0.3948	0.3815
	English expression	0.3629	0.3691
	Memory	0.2627	0.2919

Using these, the first principal component values (composite) were computed for each of the 102 students. The means and standard deviations of the first principal component values are displayed in Table A-4.

TABLE A-4

<u>Sl No</u>	<u>Exam Section</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>
1.	ISc	65	294.2618	19.167
2.	H.S(Science)	28	288.3206	14.7588
3.	H.S(Commerce)	9	275.9695	16.8923

To obtain the predicted marks the factor scores were transformed, so that they have the same mean and standard deviations as those of the school leaving examination marks of previous years using the following transformation formula:

$$Y = K + S \frac{(X_i - \bar{X})}{\sigma} \quad (\text{Das 1959})$$

where

- K = mean of ISc (H.S) marks
- S = standard deviation of ISc(H.S) marks
- \bar{X} = mean of factor scores
- σ = standard deviation of factor scores
- X_i = i th individual's factor score

The correlations between the predicted marks and those actually obtained by the students have not been verified as the actual marks obtained by these students are not yet available.

6. The weightage assigned to language, reasoning and memory for the three main subject groups, humanities, science and commerce used to fit a student into the best suited subject stream

The weights of language, reasoning and memory for each of the three major subject streams, were computed in order to classify students into the best fitting subject streams. Discriminate analysis was used to do this by taking the means of the language, reasoning and memory principal factor

scores as the three Vectors to discriminate the students into the science, humanities and commerce streams. Though every student in our sample may not have been placed in a subject stream purely on the basis of aptitude alone, the students from the schools included in our sample do take the aptitude tests through the local guidance bureau and their placement is certainly influenced by the test results to some extent.

In finding the weights the principal factor scores of each student for language and reasoning were used while the score on the memory variable was maintained as it was. Using the three subject streams and three variables we get a 3 x 3 matrix. The mean scores and values for each subject stream for each of the three factors are displayed in Table A-5.

TABLE A-5

Matrix of mean scores:

<u>Subject Stream</u>		<u>Language</u> L	<u>Reasoning</u> R	<u>Memory</u> M	<u>H</u>
Science	..	72.3366	71.6719	61.6587	0.592
Humanities	..	66.4627	65.9567	62.6728	0.324
Commerce	..	64.4350	63.5226	62.1667	0.084

Using the means and of the humanities group, we compute the weight of language (ℓ_1), reasoning (ℓ_2) and memory (ℓ_3) such that

$$\ell_1 = \frac{11}{\sigma} \bar{L} + \frac{12}{\sigma} \bar{R} + \frac{13}{\sigma} \bar{M}$$

$$\ell_2 = \frac{21}{\sigma} \bar{L} + \frac{22}{\sigma} \bar{R} + \frac{23}{\sigma} \bar{M}$$

$$\ell_3 = \frac{31}{\sigma} \bar{L} + \frac{32}{\sigma} \bar{R} + \frac{33}{\sigma} \bar{M}$$

Similarly, using the means and variances of the science group, we compute ℓ_1 , ℓ_2 and ℓ_3 . Finally, we compute the weights for the commerce group. The weights ℓ_1 , ℓ_2 , ℓ_3 for the three subject streams are displayed in Table A-6.

TABLE A-6

The weights assigned to language reasoning & memory for each of the 3 major subject streams

<u>Subject</u>	<u>N</u>	<u>Language</u> <u>1</u>	<u>Reasoning</u> <u>2</u>	<u>Memory</u> <u>3</u>
Humanities	162	0.28038	- 0.1466	- 0.1145
Science	296	0.2202	0.0688	0.7000
Commerce	42	1.5168	1.7341	1.6225

Classification of students:

In order to classify a student into the best fitting subject stream, we proceed as follows: knowing the individual's language, reasoning and memory factor scores, we compute his discriminate functions for each of the humanities, science and commerce groups using the following formula:

$$\begin{aligned} \ell_1 L + \ell_2 R + \ell_3 M - 1/2 (\ell_1 \bar{L} + \ell_2 \bar{R} + \ell_3 \bar{M}) + \log \pi \\ = 1/2 (\ell_1 \bar{L} + \ell_2 \bar{R} + \ell_3 \bar{M}) + \log \pi \end{aligned}$$

Having obtained his discriminate scores for each of the subject groups, the individual is placed into that subject group in which he obtains the highest discriminating score.

Appendix B.1.

Local Norms for the 1960 revision of the Cooperative English Test, Form 2B: Vocabulary.

Score Group	Frequency.	Cumulative Frequency	Percentile Rank.	Percentile Band.
<hr/>				
174 - 175	2	742	99	98 - 100
172 - 173	10	740	99	96 - 100
170 - 171	12	730	98	95 - 99
168 - 169	8	718	96	93 - 99
166 - 167	14	710	95	90 - 98
164 - 165	18	696	93	88 - 96
162 - 163	15	678	90	85 - 95
160 - 161	26	663	88	81 - 93
158 - 159	20	637	85	78 - 90
156 - 157	27	617	81	74 - 88
154 - 155	26	590	78	70 - 85
152 - 153	25	564	74	66 - 81
150 - 151	35	539	70	62 - 73
148 - 149	25	504	66	56 - 74
146 - 147	37	479	62	49 - 70
144 - 145	56	442	56	44 - 66
142 - 143	40	386	49	37 - 62
140 - 141	46	346	44	31 - 56
138 - 139	47	300	37	24 - 49
136 - 137	48	253	31	17 - 44
134 - 135	59	205	24	12 - 37
132 - 133	42	146	17	8 - 31
130 - 131	31	104	12	4 - 24
128 - 129	34	73	8	2 - 17
126 - 127	20	39	4	1 - 12
125 - 124	10	19	2	1 - 8
122 - 123	6	9	1	1 - 4
120 - 121	2	3	1	1 - 2
118 - 119	0	1	1	1 - 0
116 - 117	1	1	1	0 - 1

Total Number of Students = 742

Appendix B.2.

Local Norms for the 1960 revision of the Cooperative English Test, form 2B: Level of Comprehension.

= = = =

Score Group	Frequency.	Cumulative Frequency.	Percentile Rank.	Percentile Band.
174 - 175	1	742	99	99 - 100
172 - 173	5	741	99	98 - 100
170 - 171	7	736	99	96 - 99
168 - 169	11	729	98	94 - 99
166 - 167	11	718	96	92 - 99
164 - 165	13	707	94	89 - 98
162 - 163	17	694	92	85 - 96
160 - 161	27	677	89	81 - 94
158 - 159	32	650	85	76 - 92
156 - 157	41	618	81	71 - 89
154 - 155	30	577	76	68 - 85
152 - 153	41	547	71	65 - 81
150 - 151	2	506	68	59 - 76
148 - 149	42	504	65	54 - 71
146 - 147	44	462	59	48 - 68
144 - 145	41	418	54	41 - 65
142 - 143	47	377	48	35 - 59
140 - 141	55	330	41	28 - 54
138 - 139	38	275	35	21 - 48
136 - 137	54	237	28	16 - 41
134 - 135	47	183	21	12 - 35
132 - 133	33	136	16	7 - 28
130 - 131	35	103	12	5 - 21
128 - 129	27	68	7	3 - 16
126 - 127	12	41	5	2 - 12
124 - 125	10	29	3	1 - 7
122 - 123	12	19	2	1 - 5
120 - 121	5	7	1	1 - 3
118 - 119	1	2	1	1 - 2
116 - 117	0	1	1	1 - 1
114 - 115	0	1	1	0 - 1
112 - 113	1	1	1	0 - 1

Total Number of Students -- 742

Appendix B.3.

Local Norms for the 1960 revision of the Cooperative English tests Form 2B: Speed of Comprehension.

Score group	Frequency	Cumulative Frequency.	Percentile Rent	Percentile Band.
172-173	3	742	99	99-100
170-171	2	739	99	99-100
168-169	2	737	99	98- 99
166-167	3	735	99	98- 99
164-165	11	732	98	95- 99
162-163	7	721	98	94- 99
160-161	12	714	95	91- 98
158-159	16	702	94	88- 98
156-157	21	686	91	85- 95
154-155	17	665	88	81- 94
152-153	36	648	85	76- 91
150-151	28	612	81	69- 88
148-149	46	584	76	63- 85
146-147	53	538	69	57- 81
144-145	36	485	63	50- 76
142-143	54	449	57	40- 69
140-141	53	395	50	29- 63
138-139	97	342	40	21- 57
136-137	61	245	29	14- 50
134-135	60	184	21	8- 40
132-133	46	124	14	4- 29
130-131	38	18	8	1- 21
128-129	23	40	4	1- 14
126-127	15	17	1	1- 8
124-125	1	2	1	0- 4
122-123	1	1	1	0- 1

Total Number of Students 742

Appendix B.4.

Local Norms for the 1960 revision of the Cooperative English Test, form 2B: Total Reading Score.

= = = = =

Score Group	Frequency.	Cumulative frequency.	Percentile Rank	Percentile Band.
172-173	5	742	99	99-100
170-171	1	737	99	98-100
168-169	5	736	99	96- 99
166-167	10	731	98	94- 99
164-165	15	721	96	92- 99
162-163	16	706	94	90- 98
160-161	11	690	92	88- 96
158-159	17	679	90	84- 94
156-157	23	662	88	79- 92
154-155	30	639	84	74- 90
152-153	40	609	79	69- 88
150-151	36	569	74	64- 84
148-149	40	533	69	57- 79
146-147	43	493	64	51- 74
144-145	51	450	57	44- 69
142-143	47	399	51	36- 64
140-141	50	352	44	28- 57
138-139	64	302	36	19- 51
136-137	66	238	28	12- 44
134-135	65	172	19	7- 36
132-133	43	107	12	3- 28
130-131	30	64	7	1- 19
128-129	19	34	3	1- 12
126-127	11	15	1	1- 7
124-125	3	4	1	1- 3
122-123	0	1	1	0- 1
120-121	1	1	1	0- 1

Appendix B.5.

Local Norms for the 1960 Revision of the Cooperative English Test, form 2B: English Expression.

= = = =

Score Group	Frequency	Cumulative Frequency	Percentile Rank.	Percentile Band.
176 - 177	2	742	99	99 - 100
174 - 175	1	740	99	99 - 100
172 - 173	0	739	99	99 - 99
170 - 171	3	739	99	98 - 99
168 - 169	3	736	99	97 - 99
166 - 167	6	733	98	95 - 99
164 - 165	16	727	97	92 - 99
162 - 163	16	711	95	90 - 98
160 - 161	20	695	92	85 - 97
158 - 159	19	675	90	80 - 95
156 - 157	44	656	85	74 - 92
154 - 155	34	612	80	68 - 90
152 - 153	59	578	74	61 - 85
150 - 151	36	519	68	54 - 80
148 - 149	60	483	61	48 - 74
146 - 147	46	423	54	41 - 68
144 - 145	31	377	48	33 - 61
142 - 143	72	338	41	26 - 54
140 - 141	39	266	33	20 - 48
138 - 139	65	227	26	14 - 41
136 - 137	33	162	20	9 - 33
134 - 135	49	129	14	6 - 26
132 - 133	28	80	9	4 - 20
130 - 131	20	52	6	2 - 14
128 - 129	7	32	4	1 - 9
126 - 127	14	25	2	1 - 6
124 - 125	5	11	1	1 - 4
122 - 123	3	6	1	0 - 2
120 - 121	3	3	1	0 - 1

Appendix B.6.

Local Norms for the 1960 Revision of the Cooperative English Test, form 2B: Total English Score.

= = =

Score Group	Frequency.	Cumulative Frequency	Percentile Rank	Percentile Band.
174 - 175	1	742	99	99 - 100
172 - 173	1	741	99	99 - 100
170 - 171	4	740	99	98 - 99
168 - 169	6	736	99	97 - 99
166 - 167	5	730	98	95 - 99
164 - 165	14	725	97	92 - 99
162 - 163	19	711	95	90 - 98
160 - 161	16	692	92	87 - 97
158 - 159	18	676	90	83 - 95
156 - 157	28	658	87	78 - 92
154 - 155	35	630	83	72 - 90
152 - 153	38	595	78	67 - 87
150 - 151	41	557	72	60 - 83
148 - 149	41	516	67	53 - 78
146 - 147	53	475	60	45 - 72
144 - 145	56	422	53	37 - 67
142 - 143	58	366	45	29 - 60
140 - 141	69	308	37	21 - 53
138 - 139	52	239	29	14 - 45
136 - 137	60	187	21	8 - 37
134 - 135	48	127	14	5 - 29
132 - 133	33	79	8	3 - 21
130 - 131	18	46	5	1 - 14
128 - 129	16	28	3	1 - 8
126 - 127	10	12	1	0 - 5
124 - 125	2	2	1	0 - 3

Appendix C.1.

Individual Score Norms* for the "Factorial Nonverbal Reasoning Tests*** and the "Verbal Reasoning Test"***

Percentage score.	Factorial Nonverbal Reasoning Tests			Verbal Reasoning Test	
	Percentile Bands			Percentile Band	Percentage Score
	Incomplete Sets.	Combinations.	Analogies		
(1)	(2)	(3)	(4)	(5)	(6)
100.0			99.4-100.0		
97.5			98.5- 99.9	99.6-100.0	96-97
95.0	99.5-100.0	99.8-100.0	96.5- 99.4	99 -100.0	94-95
92.5	98.9- 99.9	99.6- 99.9	90.0- 92.5	97 - 99.9	92-93
90.0	98.0- 99.5	99.3- 99.8	83 - 95.5	96 - 99.8	90-91
87.5	97 - 98.9	99.2- 99.6	74 - 90	93 - 99.6	88-89
85.0	96 - 99	99.0- 99.3	65 - 83	88 - 99	86-87
82.5	93 - 97	98.6- 99.2	58 - 74	83 - 97	84-85
80.0	91 - 96	98.0- 99.0	50 - 65	77 - 96	82-83
77.5	88 - 93	97.0- 98.6	43 - 58	69 - 93	80-81
75.0	85 - 91	97 - 98	38 - 50	61 - 88	78-79
72.5	81 - 88	95 - 97	33 - 43	54 - 83	76-77
70.0	76 - 85	94 - 97	29 - 38	46 - 77	74-75
67.5	72 - 81	93 - 95	26 - 33	39 - 69	72-73
65.0	67 - 76	92 - 94	23 - 29	33 - 61	70-71
62.5	63 - 72	90 - 93	20 - 26	27 - 54	68-69
60.0	58 - 67	88 - 92	18 - 23	22 - 46	66-67
57.5	54 - 63	85 - 90	16 - 20	17 - 39	64-65
55.0	50 - 58	82 - 88	15 - 18	13 - 33	62-63
52.5	45 - 54	78 - 85	14 - 16	10 - 27	60-61
50.0	41 - 50	74 - 82	13 - 15	8 - 22	58-59
47.5	37 - 45	69 - 78	12 - 14	7 - 17	56-57
45.0	33 - 41	64 - 74	10 - 13	6 - 13	54-55
42.5	30 - 37	58 - 69	9 - 12	4 - 10	52-53
40.0	27 - 33	53 - 64	9 - 10	3 - 8	50-51
37.5	23 - 30	47 - 58	8 - 9	2 - 7	48-49
35.0	18 - 27	41 - 53	7 - 9	2 - 6	46-47
32.5	15 - 23	34 - 47	6 - 8	2 - 4	44-45

* Proforma adopted from Educational Testing Service,
"Cooperative English tests Manual for Interpreting Scores",
Princeton, New Jersey, U.S.A., 1960.

** Appraisal Division, Indian Statistical Institute, Calcutta.

Appendix C.1 (contd)

Individual-Score Norms (continued)

Percentage Score	Factorial Nonverbal Reasoning Tests				Verbal Reasoning Tests	
	Percentile Bands				Percentile Band	Percentage Score
	Incomplete Sets	Combi- nations.	Analogy			
(1)	(2)	(3)	(4)	(5)	(6)	
30.0	12 - 18	29 - 41	5 - 7	1.5 - 3.0	42 - 43	
27.5	9 - 15	23 - 34	4 - 6	1.0 - 2.0	40 - 41	
25.0	7 - 12	18 - 29	4 - 5	0.7 - 2.0	38 - 39	
22.5	5 - 9	13 - 23	3.2 - 4.0	0.6 - 2.0	36 - 37	
20.0	3 - 7	9 - 18	2.2 - 4.0	0.5 - 1.5	34 - 35	
17.5	1.5 - 5.0	6 - 13	1.4 - 3.2	0.4 - 1.0	32 - 33	
15.0	0.8 - 3.0	3 - 9	0.9 - 2.2	0.3 - 0.7	30 - 31	
12.5	0.3 - 1.5	2.1 - 6.0	0.4 - 1.4	0.2 - 0.6	28 - 29	
10.0	0 - 0.8	1.3 - 2.0	0.2 - 0.9	0.1 - 0.5	26 - 27	
7.5		0.8 - 2.1	0.1 - 0.4	0 - 0.4	24 - 25	
5.0		0.4 - 1.3	0 - 0.2	0 - 0.3	22 - 23	
2.5		0.1 - 0.8				
0.0		0 - 0.4				
Median	51.48	35.45	76.17	71.06		
Lower Quartile	35.80	25.63	63.89	63.66		
Upper Quartile	66.47	47.77	84.56	77.97		

Appendix C.2.

Local Norms* for the "Factorial Nonverbal Reasoning
Test: Incomplete Sets"***

Percentage Score	Raw Score	Fre- quency	Cumulative Frequency	Percentile Rank	Percentile Band
(1)	(2)	(3)	(4)	(5)	(6)
95	38	1	825	99.9	99.5 - 100.0
93	37	6	824	99.5	98.9 - 99.9
90	36	4	818	98.9	98.0 - 99.5
88	35	13	814	98	97 - 98.9
85	34	7	801	97	96 - 99
83	33	11	794	96	93 - 97
80	32	24	783	93	91 - 96
78	31	22	759	91	88 - 93
75	30	26	737	88	85 - 91
73	29	25	711	85	81 - 88
70	28	38	686	81	76 - 85
68	27	36	648	76	72 - 81
65	26	43	612	72	67 - 76
63	25	28	569	67	63 - 72
60	24	42	541	63	58 - 67
58	23	35	499	58	54 - 63
55	22	36	464	54	50 - 58
53	21	38	428	50	45 - 54
50	20	40	390	45	41 - 50
48	19	30	350	41	37 - 45
45	18	33	320	37	33 - 41
43	17	34	287	33	30 - 37
40	16	18	253	30	27 - 33
38	15	25	235	27	23 - 30
35	14	46	210	23	18 - 27
33	13	27	164	18	15 - 23
30	12	25	137	15	12 - 18
28	11	23	112	12	9 - 15
25	10	23	89	9	7 - 12
23	9	16	66	7	5 - 9
20	8	18	50	5	3 - 7
18	7	16	32	3	1.5 - 5.0
15	6	7	16	1.5	0.8 - 3.0
13	5	4	9	0.8	0.3 - 1.5
10	4	5	5	0.3	0 - 0.8

Total Number of Students ... 825

* Proforma adopted from the Educational Testing Service,
"Cooperative English Tests Manual for Interpreting
Scores", Princeton, New Jersey, U.S.A., 1960.

** Appraisal Division, Indian Statistical Institute,
Calcutta.

Appendix C.3.

Local Norms* for the "Factorial Nonverbal Reasoning
Test: Combinations" **

Percentage Score	Raw Score	Fre- quency	Cumulative Frequency	Percentile Rank	Percentile Band
(1)	(2)	(3)	(4)	(5)	(6)
.95	38	2	826	99.9	99.8 - 100
.93	37	0	824	99.8	99.6 - 99.9
.90	36	3	824	99.6	99.3 - 99.8
.88	35	1	821	99.3	99.2 - 99.6
.85	34	0	820	99.2	99.0 - 99.3
.83	33	3	820	99.0	98.6 - 99.2
.80	32	5	817	98.6	98.0 - 99.0
.78	31	5	812	98	97.0 - 98.6
.75	30	5	807	97	97 - 98
.73	29	9	802	97	95 - 97
.70	28	10	793	95	94 - 97
.68	27	13	783	94	93 - 95
.65	26	8	770	93	92 - 94
.63	25	12	762	92	90 - 93
.60	24	13	750	90	88 - 92
.58	23	19	737	88	85 - 90
.55	22	28	718	85	82 - 88
.53	21	29	690	82	78 - 85
.50	20	33	661	78	74 - 82
.48	19	29	628	74	69 - 78
.45	18	51	599	69	64 - 74
.43	17	42	548	64	58 - 69
.40	16	52	506	58	53 - 64
.38	15	40	454	53	47 - 58
.35	14	51	414	47	41 - 53
.33	13	54	363	41	34 - 47
.30	12	48	309	34	29 - 41
.28	11	48	261	29	23 - 34
.25	10	44	213	23	18 - 29
.23	9	44	169	18	13 - 23
.20	8	38	125	13	9 - 18
.18	7	29	87	9	6 - 13
.15	6	23	58	6	3 - 9
.13	5	13	35	3	2.1 - 6
.10	4	10	22	2.1	1.3 - 3
.8	3	3	12	1.3	0.8 - 2.1
.5	2	5	9	0.8	0.4 - 1.3
.3	1	2	4	0.4	0.1 - 0.8
0	0	2	2	0.1	0 - 0.4
Total Number of students 826					

* Proforma adopted from the Educational Testing Service,
"Cooperative English Tests Manual for Interpreting
Scores", Princeton, New Jersey, U.S.A., 1960.

** Appraisal Division, Indian Statistical Institute, Calcutta

Local Norms* for the "Factorial Reasoning Test: Analogies" **

Appendix C.4.

Percentage Score.	Raw Score.	Frequency.	Cumulative frequency.	Percentile Rank.	Percentile Band.
100	40	1	826	99.9	99.4 - 100.0
98	39	7	825	99.4	98.5 - 99.9
95	38	9	818	98.5	96.5 - 99.4
93	37	40	809	95.5	90.0 - 98.5
90	36	52	769	90	83 - 95.5
88	35	70	717	83	74 - 90
85	34	73	647	74	65 - 83
83	33	70	574	65	58 - 74
80	32	56	504	58	50 - 65
78	31	66	448	50	43 - 58
75	30	50	382	43	38 - 50
73	29	43	332	38	33 - 43
70	28	34	289	33	29 - 38
68	27	24	255	29	26 - 33
65	26	29	231	26	23 - 29
63	25	23	202	23	20 - 26
60	24	23	179	20	18 - 23
58	23	17	156	18	16 - 20
55	22	11	139	16	15 - 18
53	21	10	128	15	14 - 16
50	20	6	118	14	13 - 15
48	19	10	112	13	12 - 14
45	18	11	102	12	10 - 13
43	17	10	91	10	9 - 12
40	16	8	81	9	9 - 10
38	15	4	73	9	8 - 9
35	14	8	69	8	7 - 9
33	13	10	61	7	6 - 8
30	12	4	51	6	5 - 7
28	11	8	47	5	4 - 6
25	10	5	39	4	4 - 5
23	9	4	34	4	3.2 - 4.0
20	8	8	30	3.2	2.2 - 4.0
18	7	8	22	2.2	1.4 - 3.2
15	6	4	14	1.4	0.9 - 2.2
13	5	5	10	0.9	0.4 - 1.4
10	4	4	5	0.4	0.2 - 0.9
8	3	0	1	0.2	0.1 - 0.4
5	2	1	1	0.1	0 - 0.2

Total Number of students 826

* Proforma adopted from the Educational Testing Service, "Cooperative English Tests Manual for Interpreting Scores", Princeton, New Jersey, U.S.A., 1960.

** Appraisal Division, Indian Statistical Institute, Calcutta.

Appendix C.5.

Local Norms* for the "Verbal Reasoning Test"***

Percentage Score	Frequency	Cumulative Frequency	Percentile Rank	Percentile Band
(1)	(2)	(3)	(4)	(5)
96 - 97	1	826	99.9	99.6 - 100
94 - 95	0	825	99.8	99. - 100
92 - 93	4	825	99.6	97 - 99.9
90 - 91	12	821	99	96 - 99.8
88 - 89	9	809	97	93 - 99.6
86 - 87	15	800	96	88 - 99
84 - 85	35	785	93	83 - 97
82 - 83	43	750	88	77 - 96
80 - 81	43	707	83	69 - 93
78 - 79	58	664	77	61 - 88
76 - 77	66	606	69	54 - 83
74 - 75	67	540	61	46 - 77
72 - 73	62	473	54	39 - 69
70 - 71	69	411	46	33 - 61
68 - 69	37	342	39	27 - 54
66 - 67	63	305	33	22 - 46
64 - 65	36	242	27	17 - 39
62 - 63	45	206	22	13 - 33
60 - 61	39	161	17	10 - 27
58 - 59	29	122	13	8 - 22
56 - 57	20	92	10	7 - 17
54 - 55	13	73	8	6 - 13
52 - 53	12	60	7	4 - 10
50 - 51	5	48	6	3 - 8
48 - 49	14	43	4	2 - 7
46 - 47	6	29	3	2 - 6
44 - 45	5	23	2	2 - 4
42 - 43	3	18	2	1.5 - 3.0
40 - 41	2	15	2	1.0 - 2.0
38 - 39	2	13	1.5	0.7 - 2.0
36 - 37	5	11	1.0	0.6 - 2.0
34 - 35	0	6	0.7	0.5 - 1.5
32 - 33	1	6	0.6	0.4 - 1.0
30 - 31	1	5	0.5	0.3 - 0.7
28 - 29	1	4	0.4	0.2 - 0.6
26 - 27	2	3	0.3	0.1 - 0.5
24 - 25	0	1	0.2	0 - 0.4
22 - 23	1	1	0.1	0 - 0.3

Total Number of Students 826

* Proforma adopted from the Educational Testing Service, "Cooperative English Tests Manual for Interpreting Scores", Princeton, New Jersey, U.S.A., 1960.

** Appraisal Division, Indian Statistical Institute, Calcutta.

LIST OF VARIOUS OCCUPATIONS IN THE SAMPLE :-

- | | |
|--------------------------------|----------------------------------|
| 1. Business | 53. Chief Engineer |
| 2. Labour Officer | 54. Police Superintendent |
| 3. Musician | 55. Scientist |
| 4. Shoe maker | 56. Executive Engineer |
| 5. Jeweller | 57. Legal Advisor |
| 6. Hotel Manager | 58. Manager Cadbury |
| 7. Fur Skin Merchant | 59. Superintendent L.I.C. |
| 8. Exporter | 60. Manager |
| 9. Carpenter | 61. Head of Personnel Dept. |
| 10. Adm. Officer | 62. Electrical Engineer |
| 11. Refrigeration | 63. Railway Guard |
| 12. Truck and Tank Driver | 64. Ward Master |
| 13. Colliery Supervisor | 65. Director General of |
| 14. Broker | Ordnance Factory |
| 15. Chief Mechanical Engineer | 66. Printer |
| 16. Clerk | 67. Harbour Master |
| 17. Service | 68. Director of I.J.M. |
| 18. Advocate | 69. Income Tax Commissioner |
| 19. Barrister | 70. Air Force |
| 20. Accountant | 71. Government Officer |
| 21. Account Taxation | 72. Assistant Foreman |
| 22. Clergyman | 73. Factory Manager |
| 23. Officer of Company | 74. Store Manager |
| 24. Divisional Engineer | 75. D.G. M.G. |
| 25. Police Officer | 76. Regional Manager |
| 26. Army Officer | 77. Publicity Manager |
| 27. Doctor | 78. Asstt. Harbour Masters |
| 28. Professor | 79. Employed in Merchant Office |
| 29. Plywood Inspector | 80. Sales Manager |
| 30. Draftsman | 81. Controller of Stores |
| 31. Chartered Accountant | 82. Civil Engineer |
| 32. Travel Agent | 83. Welding |
| 33. Teacher | 84. Radio Officer |
| 34. Police Inspector | 85. Dept. Controller of |
| 35. Supervisor | Customs. |
| 36. Head Assistant to Governor | 86. Inspector of Arms & |
| 37. Landlord | Ammunition |
| 38. Journalist. | 87. Station Officer of |
| 39. Engineer | Fire-Brigade. |
| 40. Officer | 88. Security Officer |
| 41. Income Tax Officer | 89. Engine Driver |
| 42. Railway Officer | 90. Process Foreman |
| 43. Senior Chemical Engineer | 91. Cloth Merchant |
| 44. Music Director | 92. Salesman |
| 45. Chemist | 93. Asstt. Manager |
| 46. Manager Pet Pump | 94. Auditor |
| 47. Agent United Bank | 95. Contractor |
| 48. Ppal Merchant. | 96. Architect |
| 49. Upper Division Clerk | 97. Principal |
| 50. Employed in Private Firm | 98. Railway Inspector |
| 51. Cashier | 99. Sales Executive |
| 52. Trader | 100. Merchant |

contd...

Appendix D.1

contd....

101. Secretary to Principal
102. Chief Chemist
103. General Manager to S.E. Railway
104. Director General Works Manager
(Metallurgist)
105. Industrialist
106. Aeronautical Engineer
107. Director General of Com. Intelligence &
Statistics
108. Editor
109. Marine Engineer
110. Stevedor
111. Member Legislative Assembly
112. Magician
113. Film Distributor
114. Dredger and Dispatch Port Commissioner
115. Insurance Officer
116. Supervisor in Tobs Dept. Statesman
117. Post & Telegraph
118. Purser Shipboard
119. Tea Planter
120. Manager Calcutta Club
121. Telegraph Master
122. Secretary to Chief Minister
123. Secretary Insurance Asson. India
124. Traffic Inspector

* * *

Appendix D.2

OCCUPATIONAL CLASSIFICATION

1. Professional and Semi-Professional :

Physician
Priest or Clergyman
Trained Librarian
Professional Artist
Professor or Teacher
Lawyer
Electrical Engineer
Architect
Actor or entertainer
Scientist
Trained Nurse
Dentist
Professional author
Journalist
Chief Accountant
Chartered Accountant
Income Tax
Music Director
Magician

2. Managerial, Executive and Proprietorial.

Broker

Proprietor or manager of business firm
employing five or more

Major executive in government agency or
department

Administrator in educational institution

Police official

Army, Navy or Air Force officers

Officer of company.

Head Assistant to Governor

Landlord

Senior Chemical Engineer

Chemist

Manager Cadbury

Head of Personnel Department

Director general of ordnance Factory

Printer

Director of I.J.M.

General Manager to S.E.Rly.

Director General

Industrialist

M.L.A.

3. Sales people and business personnel.

Broker

Contractor

Owner or manager of small business (-5)

Sales employee of retail or wholesale firm

Travelling salesman

Ticket seller

Business

Labour officer

Jeweller

Hotel Manager

Fur-skin merchant

Exporter

Plywood Inspector

Manager Petrol Pump

Trader

Tea Planter

Manager Calcutta Club

4. Clerical workers and related occupations.

Service

Cashier

Typist

File Clerk

Minor Manager

Telegraph operator

Secretary

Book-keeper

Clerk in office

Receptionist

Ticket Collector

Telephone operator

Purser Shipboard

Film distribution

5. Skilled and semi-skilled personnel and technical workers.

Electrician

Painter

Auto Mechanic

Locomotive driver

Laundry worker

Craftsmen

Bricklayer

Printer

Metal worker

Railway brakeman

Tailor

Technical factory worker

Stevador

Draughtsman

Carpenter

Cook

Shoe cobbler

Taxi Driver

Barber-hairdresser

Foreman in factory

Railway guard

Refrigeration

Tank and truck driver

Colliery supervisor

Supervisor

6. Unskilled workers:

Coolie labourer

Domestic service as bearers

Unskilled worker in factories

Waiter in restaurants

Rickshaw walla

7. Farmers and farm labourer

8. Military and police personnel, except officers

9. Don't know, no response or unclassified in above design:

Retired

Deceased.

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